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High Growth Markets	1989	1990	1991	1992
Medical Applications	15	25	40	60
Industrial Applications	30	39	46	51
Total	45	64	86	111
% of total	55%	63%	68%	72%
Mature Markets				
Defense Applications	36	38	40	42
% of total	45%	37%	32%	28%
Total Revenue	81	102	126	15

Nobell Chem
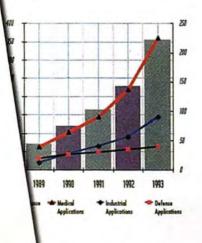
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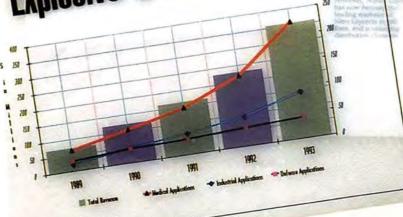
... now become a leading marketer of Nitro Glycerin in pill form, to aid ... uses. As a result of this development, Nobell Chem is now expanding ... distribution channels.

1989	1990	1991	1992	1993
15	25	40	60	85
30	39	46	51	72
36	38	40	42	44
81	102	126	153	201

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Technical Difficulties and Help
Although we can't offer any telephone assistance, *MacUser* welcomes your technical questions. If you've got a Mac question or problem, send it to Help Folder, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. If we can't give you an answer, we'll find someone who can. Because of the volume of mail we receive, we can't answer all your questions, so we also recommend that you take advantage of your local user groups. You can find the one nearest you by calling Apple toll-free at (800) 538-9696, ext. 500.

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If you have an idea for an article you'd like to write, we'd like to read it. Send a query letter with samples of your writing (published if possible) and some information about your background to Jon Zilber, Executive Editor, *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. No calls please. Since we rarely buy unsolicited manuscripts, save yourself some work and don't send us a completed article without writing first. Please allow four to six weeks for a reply.

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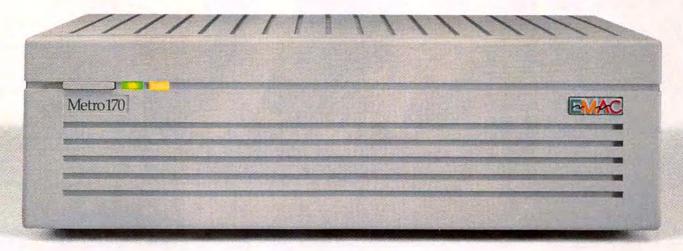
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MacUser

Graphic Examples

Artist, engineer, designer, accountant — no matter who you are, it's likely that you use a graphics program on the Mac. And, whether your artistic efforts are bar charts or 3-D renderings, it's a good bet you're baffled by the Mac's abundance of graphics formats. Understanding the difference between bit-mapped and object-oriented graphics can be frustrating, not to mention the dozen or so file formats for Mac graphics — or the fact that every application accepts a different combination of these formats. It's enough to confuse even the intrepid *MacUser* art staff.

A year ago, we ran a two-part article on graphics formats. It generated a tremendous response — some readers even ripped the pages out and taped them to their walls for easy reference. (Hmmm, we thought, now *there's* an idea . . . .) Thanks to a host of new programs and technological advances such as 24-bit color, we've been deluged with requests to reprint our

Senior editor Aileen Abernathy charts the course of graphics formats.

treatise on graphics formats. So in this month's Desktop Publishing section, you'll find the answer to your prayers: an updated guide to Mac graphics on a pull-out poster!

The poster's information was compiled by senior editor Aileen Abernathy, our resident DTP expert, and Salvatore Parascandolo, a *MacUser* contributing editor and graphics guru extraordinaire. The DTP duo quizzed the developers of more than 40 Mac programs about their graphics capabilities and then supplemented those answers with extensive testing. Aileen and Sal battled importation snafus, smooth curves mutated into jagged junk, misplaced colors, and printing boycotts — all to provide you with the definitive guide to graphics formats.

To create the poster, we turned to designer Lori Barra Nason, who's no stranger to the mysteries of DTP. She's served as the art director for the highly regarded Clement Mok designs group and *Publish* magazine.

One side of the poster contains our Graphics Glossary, which spells out the difference between PICT and TIFF and shows you why bit-mapped and object-oriented graphics don't behave the same way. The other side has two indispensable charts: The Program Compatibility chart shows the importing, editing, and printing capabilities of the major graphics programs (including drawing, painting, image retouching, 3-D, page layout, and presentations packages), and the Format Conversion chart lists the various programs that let you convert an image from one graphics format into another.

Hang this poster nearby, and you'll never be confused again by the alphabet soup of graphics formats.

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LETTERS

COMPILED BY JAMES BRADBURY

Market Talk

Paul Somerson (June '90, page 25) keeps missing the point. Apple needs to increase its market share to survive. The reason this hasn't occurred isn't simply due to the promise of Windows 3. A 386 PC clone that has good performance with a 40-megabyte hard-disk drive sells at a price that an individual or small business can afford — about $2,000. For this amount, Apple offers the outdated Mac Plus with a 20-megabyte hard-disk drive or a two-floppy SE that really shouldn't cost more than $1,000. Yes, both of these machines have great graphical user interfaces, but they're too slow for office work. So people keep buying more clones than Macs.
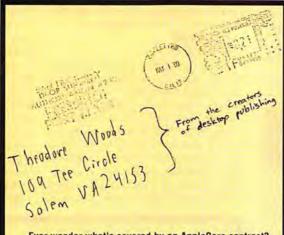
If Apple priced the SE/30 or an equivalent machine at $2,000 and a 68030 color machine at about $2,500, then I believe it could greatly increase its market share. If you persist in thinking that superior technology alone ensures success, just ask Sony how well its Beta VCRs are selling.

Bruce Anselmo
Ventura, CA

Sure, Apple should widen its market. But just lowering prices a bit won't do it; bargain-basement IBM clones will always be far cheaper. Licensing the old ROMs to Tandy or Taiwan would help. Offering powerful new low-end systems that aren't overly crippled would be a step in the right direction.

What Apple really has to do is market the current Mac user interface far better, keep its developers happy and successful, make Macs the systems for all of us instead of just the rest of us, be the cutting-edge technology leader, and make sure that the industry's next breakthrough interface has Apple's name on it and comes out very soon. — PS

Ever wonder what's covered by an AppleCare contract? Tad Woods of Salem, Virginia, did, so he wrote to Cupertino (on his dealer's advice). The not-too-enlightening response from Apple Customer Service read in part: "The peripheral hardware you listed (keyboard, mouse, video car) is covered under the terms of your AppleCare contract."

"They must be referring to that new helo-car," says Tad, a video-card customer who was also less than impressed with hand-addressed official correspondence from the company he considers "the creator of desktop publishing." Sure, but a LaserWriter just doesn't have that personal touch.

Window Pains

I give Thom Hogan's May '90 column (page 315) on Windows versus Mac (Microsoft Word) a five-mouse rating. A former DOS-dweller, I now take the Macintosh's ease of use for granted. When you look at Windows the way Thom did, it ends up looking like a lot of flash and very little substance. It reminds me of the guys who are bald on top and insist on combing their hair over from the side. Who are they kidding?

Jeff Weiler
Fairfax, VA
Themselves. — JB

Straight Up

Robert Wiggins calls Multi-Ad Creator a "vertical-market product that offers features you'd expect to find in high-end page-layout programs" (Pinstripe Picks, June '90, page 46). What in the heck is a vertical market? People who buy elevators? Purchasing agents in a high-rise building? Would someone please define the term for me?

Steve Hines
Glendale, CA

Vertical market refers to products designed for a specific industry — in this case, advertising. We could have said, "It's a page-layout product geared to producing ads," but vertical market is a fairly common term. The reverse, horizontal market, refers to products —such as word processors and spreadsheet programs — that are designed to be useful for most businesses. The ultimate vertical product would be one that is coded for a single company's use. If you really wanted to get picky, you could describe products in degrees of elevation from horizontal to vertical, so this particular advertising-layout package might be called an 80-degree product. — LT

Disappointing Data

I was disappointed by the database-comparison article in the June '90 issue ("The Data Duelists," page 88). Actually, it's not the article that steamed me as much as the setup of the supposed "multiuser" test. You had one SE/30 set up as an AppleShare server and another SE/30 acting as a remote workstation. Is that a test of multiuser access to a database? Of course not. It shows nothing about how the performance is affected by simultaneous access to the data by remote entry stations, not to mention that the sample database is an extremely simple one.

LETTERS

It's like *Motor Trend* magazine comparing pickup trucks by starting their engines and turning left out of the driveway.

Your article perpetuates the perception that a Mac database can't do "major" work with dozens of files or hundreds of reports and postings. I realize, of course, that the time and money it would take to build such a system is huge, but one of the rags is just going to have to make that investment to give us the real story.

**David Barnett
New York, NY**

Not every database contains dozens of files or generates hundreds of reports and postings. Our results are valid for the database size we tested. In the meantime, this rag has already made a commitment to exactly the kind of massive testing capability you describe. We're building a brand new, state-of-the-art NetWork-Shop laboratory facility where, among other things, we can benchmark large databases. When the time comes, we hope to see our trucks not only on the obstacle course but also out on the highway, pedal to the metal. — MM

Do the Write Thing

My concern with Grammatik Mac, which Steven Bobker reviewed in your June '90 issue (page 59), is that it may be untrustworthy. Full-page ads for the program began appearing a month or so ago and offered a free copy of the program to those who could find all the mistakes in the letter displayed in the ad. As an example of an error Grammatik Mac would find was the sentence "So what's it done for me lately?" Circled in red was "what's it done," and the accompanying notation indicated that the phrase was in the passive voice. This is not passive voice—it's present-perfect tense. If this is the sort of advice one gets from Grammatik Mac, I would steer clear of it.

**Charles Spear
Springfield IL**

Special Delivery . . .

. . . When it comes to **color on the Mac,** beauty resides in the eye of the beholder. Dave de Coup-Crank of Pasadena, California, believes that "if Mac color is a gimmick, it's a real good one. I bought it *because* of color. However, color-output options are severely lacking. Even so, I love looking at color and having the choice of seeing black-and-white if I want."

Randy Lewis, in Palo Alto, California, also wishes that color played a more significant role: "I recently purchased a IIci with an RGB monitor, and I am *very disappointed* in the lack of meaningful uses for color in available programs and the operating system.

"Color-coding is an effective way to easily and quickly identify various elements. The only uses I have found for using color on my Mac are to color-code folders and make some of my documents look pretty. What a waste!" You may feel different when System 7 hits the streets, Randy — color plays a much greater organizational role there.

Technicolor icons probably won't be enough to tempt Jay Rohr of Randallstown, Maryland, though: "In the real world, almost without exception, those who use color go the conventional way and not the Mac-madness guinea-pig route. The technical problems of color are enormous. No one seriously embedded in the prepress-graphics environment has the time to act as a guinea pig to make the dreams of Apple and its developers come true."

Adam M. Wade of Albany, New York, sees professional color in an entirely different light: "As a graphics designer, I rely almost entirely on my Mac IIcx and my service bureau. Without 32-bit color, I'd be stuck using a slow, cumbersome, software-needy machine such as the IBM PC or I'd be out of business. The color Macintosh is the only machine that can do my job the way I want it. And if someone doesn't want 32-bit color, tell them not to buy the card!"

Speak Up: What insanely great idea could keep Apple ahead of the pack?

Windows 3 may — or may not — breathe new life into DOS, but it's already cast a cloud over Cupertino as Apple suddenly finds its technology advantage slipping. All of the pundits agree that Apple must come up with something new to stay ahead. Something big.

Send your thoughts to Special Delivery, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

LETTERS

Sexist Covers

Stop! Stop! Stop this trend of sexist covers (November '89 and July '90)! You are selling a computer magazine — not beer or rock music. You insult your readers. You should rely on content, instead of a splashy cover, to sell issues.
Alberto I. Roca
Madison, WI

Does *MacUser* have to look like a high-tech version of *Bikes, Brews, & Babes Illustrated?*

I know the attitude toward women demonstrated on the July '90 cover isn't unusual, but I expect more from those of us in the Mac world. I expect female customers should be taken as seriously as their male counterparts, and as one of those female customers, I don't want to look at a drippy tongue every time I pick up my *MacUser*. Not even if it belongs to Mel Gibson.
LeAnne Runstrom
Redwood City, CA

I think your magazine is great, but your cover does not suit your image. I was a little disgusted, to say the least, and when I passed the July issue around to others in my office (both male and female), you didn't receive rave reviews. This is a ridiculous way to grab the reader's attention. I can understand you not wanting to have a "techy-looking" cover, and your covers are usually very creative, but what happened this month?
Janeane Berstein
Boston, MA

The staff of MacUser *apologizes for any offense given by the July '90 or other recent covers. We don't want to edit a magazine with sexist covers any more than our readers want to read one. We promise future covers will feature computers and computing, not sexist images. — Ed.*

Cold, Card Cache

Please read "Fast Cache IIci and MaraThon Racer" (May '90, page 59) and then ask any average reader of *BYTE* why a cache *card* has nothing to do with the Control Panel's disk cache. Then, perhaps, rewrite the article to clear things up. No wonder users of the inferior PC clones think all Macintosh people are boneheads.
Bill Dugan
San José
Costa Rica

Unfortunately, mixing up a few words can change meaning, and it did when we erroneously equated the two types of caches in the introduction. The Control Panel's disk cache acts as a small but fast hard disk by allocating part of system RAM to hold frequently accessed disk sectors. A cache card, conversely, is a buffer between the system RAM and the CPU and is used to hold frequently used instructions and data. Because the cache is faster than ordinary RAM, the CPU doesn't have to wait as long for what it wants. Thanks for spotting our error. — JR

C's the Opportunity

I was delighted to learn that your magazine was planning to teach me "how to make the Mac do what you want it to" in your new Power Programming column. Then I found out we were supposed to download the stuff from CompuServe. I'm just a student and can't afford a modem. No problem, I'll call the toll-free number (even I can spare the odd ten bucks). No dice. Canadians apparently don't get to use it. So how about it? Can I get my Mac to do what I want it to?
Grant Gussie
Calgary, Alberta
Canada
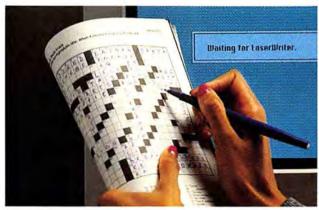
No one should be denied the opportunity to boss a computer around. Starting this month, we're adding a mail-order source to complement the toll-free number. Just send a check or international money order for $10 to Code of the West, P.O. Box 2233, El Granada, CA 94018, and explain which month's code you're missing. — JB
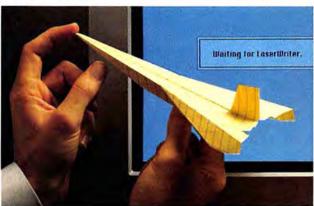
Snob Story
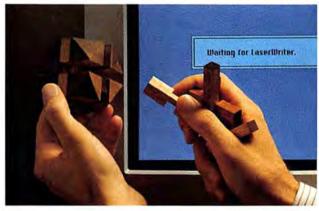
I'm tired of many of your columnists bashing PCs as their only instrument of reason. A growing number of users aren't worried about the petty, snobbish attitude of the "Mac faithful." We use computers to get the job done. We use whatever machine runs the software we need. I guess you had to be some sort of fanatic in the early Macintosh days when there was no software, and people spent all their time swapping disks. This is not the case today.

The PC is a great machine for some applications — it's both cheaper and faster than a Macintosh — while for others, Apple has the only product. Let's put our tongues back into our mouths and get to work.

Idle Macs Are The Devil's Playground.

SuperLaserSpool™ makes "Waiting for LaserWriter®" a thing of the past, and lets everyone get back to work. Immediately. Because it takes care of printing in the background, while you take care of business in the foreground.
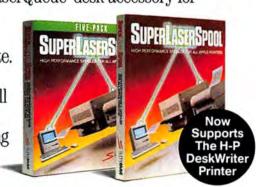
SuperLaserSpool comes complete with the LaserQueue™ desk accessory for efficient document handling—to prioritize or redirect documents to other printers. It includes document preview, and notifies users when print jobs are complete. Plus SuperLaserSpool works with just about any printer your Mac can drive. It also supports virtually all Macintosh® applications, including PageMaker®.

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T E C H N O L O G Y

LETTERS

And no, I don't own a PC — I spend 60 hours a week in front of a IIcx.

Mark Schimmenti
Coral Gables, FL

Math Reviews

On page 57 of the June '90 issue, in the comparison of Mathematica and Theorist, you state that Mathematica can't handle $tan(x) = sin(2x)$. It can solve the equation by graphing, however. There are also problems that Theorist can't solve, such as inequalities, that Mathematica and Calculus/TL (with Maple) can.

In my experience as a high school mathematics teacher, I've found that each program has its use in the proper time and place. Theorist is very good for getting students to actually do manipulations. The other programs give answers more quickly. I love and use all three.

Betty Kantrowitz
Newton, MA

As I mentioned in the review, there are some things that Theorist can't do, and Mathematica does have a few more sophisticated functions. Yet it's also true that Mathematica can't solve the example you cite and falls short of Theorist in the other examples in the article. Note that although Wolfram was not pleased with my review (see the letter below), it didn't challenge any of my statements about Mathematica's inabilities. — JR

I was disappointed by John Rizzo's review of Theorist (June '90). As Mr. Rizzo mentions in the last paragraph, he is, at best, a casual user of mathematics software, and in my opinion, that is apparent in his review.

While Prescience has produced a very polished product in Theorist, it can hardly be claimed to "reign as the new king of math programs." In contrast to Wolfram Research's Mathematica, Theorist has almost no programmability (users have to paste in lists of rules, which soon grows old for any kind of serious work). Its symbolic-mathematics capability is rudimentary at best, and it has no extended-precision arithmetic.

Theorist is, indeed, easy to start to use, but your readers can figure that out themselves — they rely on your magazine to provide more in-depth and detailed product information.

Igor Rivin
Wolfram Research
Champaign, IL

Mr. Rivin is wrong about Theorist's programmability. Although you have the option of pasting in rules, you can also type them. Theorist's lack of extended precision was noted in my review (page 59), but this doesn't shake my belief in its overall superiority. Theorist is a thoroughly useful product — for beginners as well as power users. And although I am "at best" a casual math user now, this was not true in my engineering days, when FORTRAN was the most user-friendly tool available. — JR

Fax to the Max

In response to Thom Hogan's column on the fax-modem issue ("Fax Reform," June '90, page 261), I would like to congratulate him on an accurate assessment of the present problems and advantages in this area. I have a couple of comments, though.

Experiencing strange phone bills? Move to Canada. I'm using an Abaton Interfax 12/48 (the same model mentioned in the article) and have never had the stutter problem in any calls I've made within the Bell Canada network. The only times I've had any real difficulties in communicating with other fax machines was in calling the U.S.

The future lies in the networked use of these useful if somewhat aggravating tools. The best new application is for small to medium businesses with a LAN. Hook one up to a Shiva NetSerial, and everyone can send faxes. (It's faster than waiting in line at the machine.) Even better, take a look at the new generation of E-mail-to-fax gateways. These gateways let everyone send faxes just like a regular E-mail note and let the server do all the worrying about document preparation so that you never have to see the software that runs the show.

Erik Ableson
Ottawa, Ontario
Canada

Rag Net

It was with much interest that I read your review of RagTime's latest release (June '90, page 70). A comment in the article referred to the problems users encounter when running more than one copy of RagTime with the same serial number on a network. Short of software piracy, how could this protection scheme be bothersome?

Kim St. Denny
Montclair, NJ

Music
With Your Mac

LETTERS

The problem is twofold. First, checking serial numbers across the network is a perfect example of unnecessary network traffic that can bring a net to a grinding halt. Second, network managers who legitimately buy multiple copies of a package don't want to be burdened with carting a pallet load of applications around the office and doing unique installs at each station. Keeping track of who has a particular serial number is a logistical nightmare — just think about how many times you've changed offices. When network managers perform multiple installs, they want to carry around two or three application disks and that's it. While we agree that piracy is a major problem, it isn't right to punish legitimate users for the transgressions of a few. — RI

Laps of Memory

I've been an avid Mac user for the past four years. Recently, I've read quite a bit about the various new "notebook" DOS computers (the fabulous Compaq LTE, for example). These computers have really made significant improvements. With their size, memory capabilities, and hard-disk-drive capacity, the option of shifting my business computing into the DOS environment is tempting. I definitely prefer the Mac product, but I'm tired of waiting for a real Mac laptop. All I need is a Mac with the power of a normal SE and a 20-megabyte hard-disk drive. Is something like this in the works?

Brent G. Long
Scottsdale, AZ

Check out the rundown on Mac-compatible portables in this issue for several possible solutions to your problem. By the way, you don't have to shift a business to DOS just because you use DOS portables — several simple methods of file translation are available (see "PC to Mac and Back," October '89, page 143). — JR

The A/UXidental Upgrade

While we were pleased to see mention of our Intermedia hypermedia system in "A/UX: Now We Are 2" (May '90, page 363), the article implied that Intermedia runs under A/UX 2.0. This is not true, although versions of Intermedia do presently run under A/UX versions 1.1 and 1.1.1.

Mark Sawtelle
Brown University
Providence, RI

Smarter Labels

In the review of Seiko Instruments' Smart Label Printer (May '90, page 57), the opening paragraph mentions that Seiko Instruments builds both the Smart Label Printer and the LabelWriter (which is distributed by CoStar), but the Get Info section lists CoStar as the manufacturer of the LabelWriter.

The review also recommends the CoStar LabelWriter because "CoStar is committed to improving its product (and includes two extra Casady & Greene fonts)." CoStar is not the only company committed to improving its product. The Smart Label Printer is now quieter and generates labels 25 percent faster than when it was first introduced. Seiko Instruments is working on major enhancements to the Smart Label Printer's current DA software. The company also plans to provide additional fonts and enhance the memory and list functions. A Chooser-selectable driver will also be released so that users can print labels directly from an application without needing to use the DA.

Barbara Scollon Curl
Franson & Associates, Inc.
San Jose, CA

Addictive Personality

Addictions, addictions. I'm addicted to your magazine! It all started last August when my Apple IIc bit the dust. I hadn't the foggiest idea of what was available in the computer market, as I'd been out of it for four years. My local Apple dealer suggested that I read one of the Mac magazines. Within two weeks, I had a Mac SE, software, and the peripherals that suited my needs. All of this by reading two issues of your publication. Now I know about new-product developments before my dealer does!

So where does the issue of addiction come in? I just can't get enough! But if you guys need the month to produce the quality work, then so be it. I just can't wait for my next fix, though.

Sean Root
Huntington Beach, CA

Dear Johns

John Dvorak has in the past been entertaining and often humorous — sometimes insightful – even when spouting ignorant drivel. Recently, however, he seems to have become tired (or maybe just tiresome).

Take, for instance, his June column,

LETTERS

"Linear Thinking" (page 350), where he gave the 128K Mac an innovation rating of 0. The 128K Mac was a major innovation of its time: It provided the American public with *affordable* access to bit-mapped graphics; WYSIWYG text; and the software innovation that radically changed the face of computer graphics and showed the way to desktop publishing — I refer, of course, to MacPaint. The operating system in the 128K was so well conceived that it has survived with only minor internal improvements while driving the rest of the industry to copycat imitations of its user interface. Innovation rating 0? What is Dvorak smoking?

Then I read Guy Kawasaki's column, "A Dear-John Letter." What a gem! It's even better than the previous month's column, and I didn't think that was possible at the time.

Tom Pittman
Spreckels, CA

I read Paul Somerson's column in the June issue (page 25) with interest and found his comments very supportive of those who've invested and are interested in the Apple philosophy of computing. I can only say that because of his comments, I feel much better about having recently upgraded my now-two-year-old SE to full memory capacity — preparing it for System 7.

It was then with great amazement that I read through to your last contributor, Mr. John C. Dvorak and his typical slam-banging of Apple computing ("Linear Thinking," page 350). Either you didn't know he was going to be so abusive, or you don't care what he says, and that's why his column is in last position in your publication.

James A. Hauck
Pleasanton, CA

Of course we care what Dvorak says. His point simply was that Apple should be more innovative, especially now. What we were both saying, between the lines, is that Apple has a superior product but needs to maintain its lead more aggressively and market more effectively. Besides, if you think this was "abusive," you should see what John says about DOS machines. — PS

CLARIFICATIONS

The price that appeared in our review of Blueprint in the July '90 issue, page 76, was incorrect. The correct price is $295.

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PAUL
SOMERSON

The other day I saw an ad for authentic analog watches. Like the guy who didn't realize he'd been speaking prose all his life, I had to stop for a moment before I realized that we of the PC generation grew up with analog time-keeping — but at the time, we didn't know it.

It's a digital world. But there's digital and then there's digital.

Obviously everything that goes into or comes out of a computer is digital at some point. Where the inputs and outputs differ in their digitalness is the point at which they cross between the analog and digital realms.

Some data remains digital all the way through the process; it's entered digitally, edited digitally, output digitally, stored digitally, and so on. Laser printers, for example, place dots on a page, one pixel at a time. The image on the page doesn't become anything more than a random collection of pixels until your brain overlays an interpretation on the pattern of dots and realizes that the page is actually, say, an article in *MacUser* or a long-awaited letter from Ed McMahon.

Other technologies are analog at some stages — or are presented to users through an analog metaphor. Sound, for example, is transformed into analog form before it leaves the Mac via the internal speaker and travels through the air and into your ears.

ALPHABIT SOUP

This distinction is not unlike that of the analog/digital three-letter SPARS code that appears on the labels of most audio CDs. These three letters — each of which is either an A or a D — tell you, in order, whether the initial recording, mixing, and mastering were done using analog or digital equipment. On all CDs, of course, the final letter is always a D — that is, the final product is strictly digital.

Some audiophiles contend that a DDD recording is superior to an ADD or AAD recording, because if the recording and mixing are analog, the high fidelity of CD mastering merely faithfully reproduces the inferior analog sound. Interestingly, other audiophiles argue equally strongly that it's the *digital* technique that comes up short in the fidelity department. Perhaps the only sensible way is to let your ears decide.

The Macintosh universe features some of the same gray areas. Some technologies are 100-percent digital, whereas others are more like ADD or AAD. For instance, object-oriented (or draw-type) graphics can be repeatedly copied, cut, pasted, and output to a variety of printers — all without any loss in fidelity of the original image (a hallmark of digitalness). But you often have to treat the image as a global entity, an analogish sort of quality; for example, you can't always edit an object-oriented image with pixel-by-pixel accuracy.

BIT BY BIT MAP

Bit-map (or paint-type) graphics, on the other hand, can be edited at the pixel level (another hallmark of digitalness), but they can easily get distorted when you copy them from one program to another, largely because the formats are not always 100-percent compatible. (If that analogish problem sounds painfully familiar, check out the free graphics-compatibility

A Digital Analog-y

pull-out poster included in this issue.)

This month's mammoth MacUser Labs report on scanners offers a good opportunity to reflect on why any of this matters. The bit-map approach originally dominated Mac graphics; it was tools such as MacPaint's spray painter and capabilities such as pixel-by-pixel editing that stopped you in your tracks when you first played with a Macintosh. But once the novelty faded — when playing with a Mac matured into working with a Mac — Mac users began focusing their attention on more mundane matters, such as the size of the files that a high-resolution image occupied. Getting the whole image into 1 megabyte of RAM or onto a 400K floppy became a bottleneck.

Object-based tools (such as MacDraft, MacDraw, and relative newcomers such as Adobe Illustrator and Aldus FreeHand) were a bit more complex, but they offered big payoffs in precision, output-device independence, and, in many cases, economy of file size.

But while object-based software was busy gaining followers, the whole hardware infrastructure was also improving, eliminating many of the bottlenecks that made bit-mapped graphics so difficult to use. The limits of RAM grew from 128K — first to 1 megabyte; then to 8; then to 128; and finally to the virtual-memory option you'll soon have with System 7, which will let you designate unlimited space on a storage device (such as a hard disk) to be used as if it were memory. Floppies have evolved from 400K to 800K to 1.44 megabytes to 45-megabyte removable cartridges and now to 600-plus-megabyte optical cartridges. Processor speed and network throughput have grown by leaps and bounds.

Suddenly some of those

By PAUL SOMERSON

When playing with a Mac matured into working with a Mac, users began focusing their attention on more mundane matters.

annoying problems of dealing with large bit-mapped files have affordable solutions. And as the price of scanner technology has plummeted, running a quick scan over an object instead of creating a complex object-oriented drawing doesn't seem like such a bad idea after all.

The Mac's sound capabilities have followed a similar flip-flopping pattern. The first commercially successful electronic music instruments used purely synthesized sound, electronic waveforms generated by mathematical algorithms — what you might call "object-oriented" sound. The Mac's own beep and early sound software such as MacinTalk also used this approach.

The next wave of electronic instruments, though, was driven by affordable sound samplers and sample playback units, the audio equivalent of "bit maps," which recorded actual sound and converted the acoustic sound into digital format. Like bit-mapped images, sampled sound is more straightforward than its object-oriented counterpart. Creating the sound takes no longer than recording it (just as creating a bit map takes no longer than scanning an image), whereas synthesizing a new sound can be a laborious chore (just as creating a complex object drawing can be extremely time-consuming).
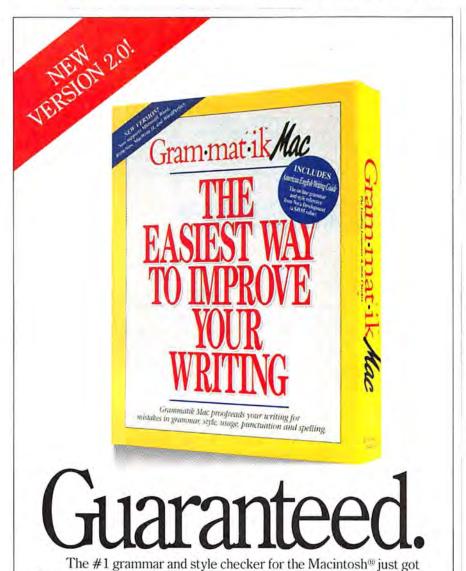
Sampling technology found its way onto the Macintosh, with low-end samplers such as Farallon's MacRecorder, high-end samplers such as Digidesign's Audio-Media, and the Macintosh's own ability to play back high-quality sampled sound.

But as with digital images, neither the bit-mapped nor the object-oriented approach to sound and music has put the other out of business. Why do musicians continue to use both? Why do object-oriented- and bit-mapped-drawing paradigms continue to flourish — sometimes in the same software program? Because — as with the analog-versus-digital debates among the audiophiles — what matters in the long run isn't whether it's digital but whether it works.

One technology seldom supplants another overnight. Rather, the winner gradually emerges simply because it proves, over time, that it works better. If something works better, people will use it, without worrying about whether it's cutting edge or not.

This month MacUser Labs also went "In Search of the Ultimate Mac." I have to admit that what they came back with looks intimidating — something no Mac may ever have achieved before. But is it the *best* Macintosh? I could go out tomorrow and pay $25,000 for a watch (an *analog* watch), but it wouldn't tell the time significantly better than the $5 digital model from the drugstore.

Only time will tell.

SOMERSON

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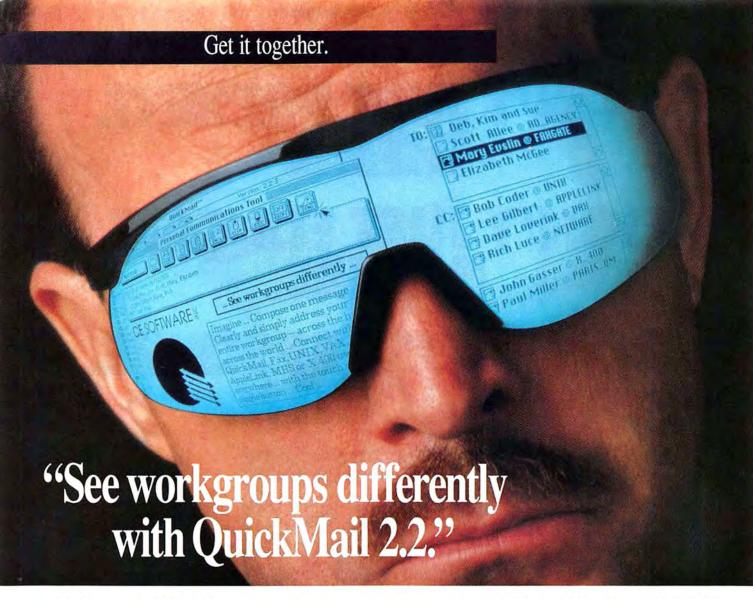
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ROBERT R. WIGGINS

otus, developer of 1-2-3 for the IBM PC and the ill-fated Jazz for the Macintosh, reentered the Mac market with a big splash at the April Macworld Expo in San Francisco. It wasn't with the long-awaited announcement of 1-2-3 for the Macintosh either. You may remember that Lotus announced its intention to announce 1-2-3 for the Mac two years ago when it mysteriously killed Modern Jazz (code-named Galaxy) right before it was ready to ship and after showing it to rave reviews at the 1988 San Francisco Expo. No, Lotus made news this time with an all-new product that is one of the first that truly

with mail-merge capabilities — brings the power of the direct-mail industry to the desktop. The big guns who get their lists on nine-track tapes no longer have small- and medium-sized businesses at such a disadvantage. Mailing-list costs are no longer so onerous, especially for multiple mailings to a selected list (good for campaigns that use follow-ups).

So what's wrong with this picture? Nothing from a business perspective but plenty from a personal one. Individual privacy has long been under assault in this country as the government and industry have worked hard at building vast databases of information about each and every American.

A Too-Open Marketplace

exploits CD-ROM's enormous storage capacity.

A major part of the news is that Lotus announced such a product for the Mac and not for the PC. This is probably due to the Mac's much greater ease of handling (the PC lacks the capabilities that HyperCard front ends provide) and the growing acceptance of CD-ROM in the Mac market. It could also be part of a conscious plan to finally give Lotus a successful Macintosh product, something it's failed at since 1984. Whatever the reasons, Lotus chose the Mac as the platform for its newest venture, Lotus MarketPlace.

In case you missed the announcement, MarketPlace is a database combined with the software necessary to extract the data, which can then be used in other programs. There are two versions of MarketPlace, each with a different database and each costing $695. MarketPlace: Business comes with one CD-ROM disc that contains information compiled by Trinet on 7.5 million businesses in the U.S. MarketPlace: Households is a nine-disc set (but you get only one regional disc for $695; additional discs cost $100 each) containing demographic and life-style data compiled by Equifax Marketing Decision Systems (formerly National Decision Systems) on 80 million households and 120 million consumers.

It's not just its use of CD-ROM technology that makes MarketPlace noteworthy. Normal practice in the address-list business is to "rent" a list for a one-time mailing. With Market-Place and its "postage meter" concept, you can extract as many as 5,000 names. The list can be used repeatedly, and additional names can be "bought" for $400 per 5,000, a practice that has been tried on font and clip-art CD-ROMs. The MarketPlace software lets you prescreen lists, so you can use a variety of search techniques until you find the one you want. Lotus has made using the lists even easier with cooperative marketing efforts with Chang Labs for C•A•T, Synex for MacEnvelope Plus, Avery for labels, and Odesta for GeoQuery. MarketPlace, in conjunction with these and similar products — even other Macintosh software such as databases and word processors

We haven't even begun to come to grips with all the implications of our information culture, and suddenly dossiers on everyone are about to be promulgated to thousands of Macs all over the country. And as with Pandora's box, once the information escapes, there's no way to ever contain it again.

Concerns about privacy and misuse of information are not new. Debates about what information should be collected by whom and made available to whom have raged for years. Both government and private enterprise continually search for improved ways to keep tabs on the populace, and they sometimes cross the line into invasion of privacy. Gossip and innuendo were often stored in credit-reporting files 15 to 20 years ago (one of the the biggest offenders in this area was Retail Credit of Atlanta, an ancestor of Equifax), and although the Fair Credit Reporting Act of 1969 was supposed to protect people, it also protected the credit bureaus by barring any legal action against a credit-reporting agency for defamation, invasion of privacy, or negligence. The whole area of privacy has been an open issue for more than 20 years, and no resolution is in sight.

In their defense, Lotus and Equifax have taken the privacy

Individual privacy has long been under assault, and dossiers on everyone are about to be promulgated to thousands of Macs all over the country.

BY ROBERT R. WIGGINS

WIGGINS

issue into consideration. Telephone numbers are not included in the Households database, individual names cannot be looked up, the street address cannot be displayed on-screen (but it can be printed out), only a simple name-and-address list can be printed out (the full record is not accessible), and individual credit data is not in the database. In other words, users of MarketPlace will be able to select people by a variety of criteria such as age, location (to the zip-code level), gender, household income, and even purchasing preferences (in more than 100 product categories), but all they'll get is a mailing list, not the actual data used to make the selections. You can have your name removed from the database by contacting either Equifax or the Direct Marketing Association's Mail Preference Program. Of course, they won't be able to recall all the discs already in circulation and erase your name from them, but as quarterly updates become available, eventually the older discs won't be used. Eventually. Provided the businesses that have bought discs subscribe to the update service.

Lotus also promises that it will sell only to legitimate businesses. Anyone can buy the software, but only "approved" firms will be sent the databases. Part of the buying process requires the potential user to sign an agreement that covers use of the product and its information. Lotus also promises that it will not sell to unethical companies, companies that use automatic-dialing systems, or companies selling illegal or misleading products or services. These are good intentions, although it is questionable how much investigating can or will be done for a $695 product.

So even though Lotus MarketPlace is a boon to many businesses seeking new (and less expensive) ways to target customers for direct mailing, its value to consumers is hard to judge, and its potential for abuse is large. Lotus and Equifax have removed much of the potential for abuse, but they can't possibly eliminate it all. Pandora's box is being opened, and we'll have to see if the benefits outweigh the drawbacks in the long run. In this computer age, our privacy is constantly at risk, and preserving it increasingly hinges on our trust in and the good intentions of a small number of people. 🔲

Microsoft. Apple modifies its System software to make sure that it will work with Microsoft's applications.

Second, Apple licensed Microsoft the look and feel of Windows 1.0. Do you think Apple did this out of strength? Apple eventually sued Microsoft over Windows 2.0. But Apple and Microsoft then entered into cross-licensing agreements for PostScript-clone and font technology.

Key point: Microsoft is an awesome force that may control personal computing. Although you may not agree with Microsoft (or the NRA), you have to respect how it became so powerful. I sure wish I could say that I built Microsoft — and so does every software-company president.

HUMBLE PIE

Second, the Macintosh developers who port their applications to Windows 3.0 are going to get a valuable lesson in humility. Back in 1984 and 1985, many DOS-oriented companies swaggered into Apple and told it how they had the resources, technical expertise, and marketing clout to dominate

GUY
KAWASAKI

It's a Window-ful Life

Microsoft recently shipped Windows 3.0, its long-awaited new face-lift for IBM PCs and compatibles, and the world is divided into two camps about its impact on Macintosh. Camp No. 1 believes Windows 3.0 is a big nail in Apple's coffin. Their thinking is that now that any old personal computer can have a graphical user interface, Apple won't have a chance. Camp No. 2 denies that Windows 3.0 is a threat at all. These people compare Windows 3.0 to cheap plastic surgery, neon Spam, and a Ferrari body on a Volkswagen chassis.

I advocate another perspective: Windows 3.0 is the best thing for Macintosh since PageMaker. Here's why:

THE MICROSOFT RIFLE ASSOCIATION

First, Windows 3.0 reveals Microsoft's ambitious plan to totally control the personal-computer industry. There are four dominant operating systems in the industry — DOS, Windows, Macintosh, and UNIX. Microsoft has had a major role in the system and application software used in all four. Microsoft created the system software for DOS and Windows; it cross-licensed the Mac's System software, and it could potentially dominate UNIX. In applications, Microsoft dominates the Mac, almost dominates DOS, is about to dominate Windows, and — well, with UNIX there's nothing to dominate.

In short, Microsoft is the National Rifle Association of personal computing. It can tell Apple, IBM, and any other computer manufacturer what to do, just as the NRA tells Congress and President Bush what to do. Microsoft's claiming that Windows is a validation of the Macintosh interface is like the NRA's claiming that automatic weapons are an expression of free speech and the right to bear arms.

Am I dreaming this up? Consider two pieces of evidence. First, most application-software developers have to modify their products when Apple ships new System software. Not

the Macintosh software market — companies such as Ashton-Tate, Software Publishing, and Lotus, for example.

As unexpected, they failed. Now companies such as MacroMind and others are probably emulating their swagger: "We're big Macintosh studs. We've been working on GUI products for the past six years. We are going to clean up in the Windows market." On the other side of the table, Microsoft's Windows evangelists are nodding their heads, promising co-marketing to suck them in, and laughing to themselves.

These Macintosh developers will fail — or at least will not succeed as wildly as their spreadsheets have been telling them: "Let's see, that's three million Windows units times 10-percent market share for me, equaling 300,000 copies of my software." When they do fail, they will be born again: "We've decided to get back to basics. We want to get closer to our customers and create more Macintosh products." Meanwhile, two punks in a garage with an 80286 clone will create the products that actually ensure the success of Windows 3.0.

Key point: As long as these companies come back to Macintosh, so what if they leave for a

> **W**indows 3.0 is the best thing that's happened to Macintosh since PageMaker.

BY GUY KAWASAKI

KAWASAKI

while? Let them go, and welcome them back. If they don't come back, forget them.

TWO MACINTOSH GUYS IN A GARAGE

Third, suppose I'm wrong, and the Macintosh companies succeed in the Windows market. That's OK too. As they are led by their wallets to the Windows market, their absence will open up attractive opportunities in the Macintosh market for the rest of us.

Once again two guys in a garage with old Macintosh IIs will have a chance to rise above today's noise in the Macintosh market and ship innovative products.

Key point: If Macintosh has innovative software, so what if Windows succeeds? Sometimes 1 plus 1 can equal 3.

EXPANSION, NOT CONVERSION

Fourth, Windows 3.0 is going to solidify IBM PC bigotry, and Macintosh evangelists and Apple will stop wasting time trying to convert people. Instead, they will focus on expanding the market for Macintosh.

Did you ever notice that the people who are the most loyal to IBM PCs have never used a Macintosh? Their minds are completely closed: "Macintosh is a wimp machine. Just give me a macho text-based computer." Now they'll get Windows 3.0 and discover that they are more productive with a graphical user interface, but they won't admit it to their Macintosh friends.

Instead the bigots will come up with more arguments such as "With Windows, I can always go back to a text-based system and its thousands of applications." "There's a lot more new software coming for Windows." "Macintosh is too expensive." Etc., etc., etc. To which we should reply, "Forget it. Forget it. Forget it."

Key point: Let IBM PC bigots wallow in their mire. Let's evangelize Macintosh in fields of milk and honey where it can increase the productivity and creativity of people who have never used a computer before.

BACK IN CUPERTINO

I'd like to mention that a fifth positive outcome is that Apple will become frightened and will work insanely hard to finish System 7, create new products, and reduce prices. But it's not likely.

Key point: Nothing is perfect.

"The Abaton scanner gave me great definition in just minutes."

Scanned on an Abaton 300/GS

Every issue of my newsletter takes shape easily now that I use the Abaton Scan 300/GS. Because this 8-bit scanner delivers 256 shades of gray. That's 240 more than the 16 shades you get from a 4-bit scanner. And that means each scanned image scan has more tone and better definition.

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The Mac Reviewer's Phrasebook

Guy Kawasaki's July '90 column (page 41) lambasting the product-review process incited some pretty strong emotions — from readers as well as from his editor. One of the problems with reviews and reviewers that he failed to mention is that sometimes reviewers lapse into a mystifying vocabulary all their own. To help you interpret what all those hardware and software evaluators really mean, here's Guy's guide to the unique lingo of reviewers.

By Guy Kawasaki

UnMac-like, as in "The interface was unMac-like." UnMac is the stock-ticker symbol for unixMachines, a newly created UNIX software company that has never heard of BMWs, condos, or the Knowledge Navigator.

Confusing dialogs, as in "The product had confusing dialogs." Confusing dialogs occur when people interrupt each other and change the subject. This was first documented at a board meeting when the president of a Macintosh software company had to explain to his venture capitalists why its product was late.

Buggy, as in "Although this version was buggy, the company assured us that a new upgrade would be out shortly." Stubborn little critters, these bugs. They stay in the larval stage until a company places its advertising for new products, when they suddenly reach adulthood.

Ease of use, as in "As far as ease of use is concerned, this version of the product made significant progress." Refers to a writer's ability to review a product without reading the product's manual. This is a commonly accepted method of reducing the time it takes to write a review at deadline.

Technical support, as in "The company's technical-support staff did not return our telephone call for two weeks." Technical support is the practice of technically

(but not really) providing support to customers. The phrase was coined by a lawyer: "Well, *technically,* you *should* do this, but you really don't have to . . . ."

System requirements, as in "The system requirements for this product included a Macintosh." This is a throwback to days gone by when The System controlled what kind of computer you could buy. It accounts for the large installed base of computers manufactured by IBM.

Disk-intensive, as in "When working with large files, it was disk-intensive." The product was really into disks. Disk earrings. Disk drink coasters. Disk necklaces. Disk buttons. Disks, disks everywhere.
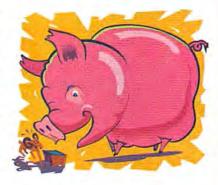
Memory hog, as in "Despite the company's claims, it was a memory hog." A memory hog is a hairy pig indigenous to the Pacific Northwest. Its maximum weight is 640 pounds, and it likes to eat first at the RAM trough.

Required a lot of swapping, as in "Saving a file required a lot of swapping." Refers to the process of trading prospective spouses until you find one that can tolerate addiction to Macintoshes. Also refers to a low-impact aerobic exercise to build muscle tone in arms.

Icon-driven, as in "The product's interface was confusing despite being icon-driven." Originally spelled Icahn-driven. Refers to a management style that ignores product development while concentrating on establishing executive bonuses and golden parachutes in the event of a hostile takeover.

NewsLine

ADOBE DEVELOPMENTS

SAN JOSE, CA — At the first Adobe Developer's Conference, held in June, Adobe made several announcements that proved it isn't standing still in the face of direct challenges from several PostScript clones as well as the yet-to-be-released Microsoft/Apple TrueImage/TrueType.

Adobe unveiled PostScript Level 2, an enhanced version of the PostScript language that promises better printer performance and a wider range of capabilities in several areas. Level 2 incorporates the existing PostScript language, performance enhancements, new features, and recently published PostScript extensions. Level 2 printers should print faster than do current Level 1 printers.

Among the new features are improved color handling, using a new screening method that promises color separations that rival high-end electronic prepress systems; color-image compression at ratios up to 25 to 1 with minimal quality degradation; and device-independent color that will let users specify and receive precise colors — regardless of which PostScript device was used to create that output in print or on-screen. Level 2 printers will also support downloadable "forms," or template pages. A template page containing elements common to many pages can be sent to a printer and remain resident. Subsequent page descriptions need only send the changed portions of the page, so printing times can be significantly reduced. The first printers to incorporate these features should begin appearing in the first quarter of 1991.

Closer to your desktop, Adobe also announced that it will write its own PostScript-printer drivers to support Windows 3.0, Presentation Manager, and the Macintosh operating system. The Adobe Mac driver will offer significant speed improvement over Apple's currently shipping LaserWriter drivers (versions 5.2 and 6.0). And when used in conjunction with PPD (PostScript Printer Description) files, which Adobe will supply, it will support the special features of various PostScript printers. So, for example, you will be able to switch trays on a dual-tray printer directly from the Print dialog box— a capability Apple has never recognized the need for in its own LaserWriter drivers. Adobe plans to provide its Mac driver to both printer and application vendors for distribution with their products.

Bobker's Dozen

BY STEVEN BOBKER
Bobker's Dozen, c/o *MacUser*
950 Tower Lane, 18th Floor
Foster City, CA 94404
Your suggestions, comments, and products for consideration are welcome.

① Fontina

Fontina is an excellent implementation of one of the two basic font-control schemes. It shows all your fonts simultaneously, in multiple columns if necessary. In general, no scrolling is required. Some fonts have initial style letters that cause them to be placed away from the rest of their families. Fontina figures this out and moves fonts to the correct logical locations (it can't do it in Word 4 and some other programs, however). It can show fonts in any one selected face and size — display in the actual face (the other basic font-managing technique) isn't an option. The Fontina INIT is trouble-free, and performance is excellent.

Eastgate Systems, P.O. Box 1307, Cambridge, MA 02238; (617) 924-9044. Version 1.0 — Albuquerque 9. $69.95.

② Screen Locker

Does the world need yet another screen locker/saver? Only if it's better than the existing standards in screen locker/savers (Pyro!, After Dark, Moire). Screen Locker tries hard but, in this initial version, comes up short. As a screen saver, it doesn't do enough: It has no color support and few options for what is displayed during screen sleep (although the clock/date function is useful, since it updates correctly). It also has a cosmetic problem when you're using two screens: The join area of the monitors doesn't update properly, but this does correct itself after a minute or so of sleep.

The screen-locker portion also just misses. You can bypass it with a simple reboot, and if the screen goes back to sleep before you return, you'll never know of the security violation. The idea of "backdoors," in case you lose your password, is nice, but backdoors are just more ways hackers can break through your security screen. If you get Screen Locker, don't enable the backdoors.

Finally, the price is too high. List is just about twice that of Pyro! or After Dark.

Now Software, 520 S.W. Harrison, Suite 435, Portland, OR 97201; (503) 274-2800. Version 1.0.4. $79.

③ DIRectory

DIRectory is an excellent file-cataloging tool. It doesn't have the extensive manipulation features of Cat•Back (Bobker's Dozen, August '90, page 47), but it is a bit faster and has an easy-to-use Finder-like interface. It also prints much nicer reports. If you plan to create printed catalogs, DIRectory should be your program of choice. Among its nice touches are its ability to include actual icons (suitably reduced) and version numbers (provided the files have correct version resources) and a DA that can find files both on your disks and in DIRectory catalogs.

Filtering and sorting abilities are average but sufficient for most users. The main problem you will have with DIRectory is obtaining it. Currently you must order it by mail from the publisher in Sweden, but the airmail service is prompt.

Seagull Engineering, Box 909, S-220 09 Lund, Sweden. Version 4.0. $79 plus $12 shipping and handling; if your check is drawn in U.S. dollars, add $3 for bank fees.

④ MacPhotography Workshop

Learning black-and-white photography is easy when you use the animated simulations of the MacPhotography Workshop. This large (seven-disk), impressive product, which is built on the CourseBuilder authoring system, teaches basic camera and darkroom techniques. It's designed for individual self-teaching as well as classroom use. Beginning and intermediate photographers will find the course a delight. The many elements of the MacPhotography Workshop use hypertext, animation, and a great deal of intelligence to make the learning experience lively; it's far more than a dry computer-based training package.

A neat extra is MacInThe-Dark, a program that uses MacinTalk to talk you through darkroom procedures. You need to create scripts for each spoken procedure (the program helps). Also remember to keep your Mac and all liquids carefully separated.

Joe Ciaglia, 2036 Spruce St., Philadelphia, PA 19103; (215) 985-1092. $79.95; postpaid, $83. Call for multiuser site license, required for academic institutions.

5 PowerKey ····················· ♣♣♣♣½

SE users have long been frustrated by their inability to use the ⌘ key to start their Macs. PowerKey is a very nicely made add-on device that solves this problem. Once plugged in, it causes the ⌘ key to start up SEs and SE/30s. That in and of itself would be enough to earn a good rating, but there's more. The included software lets you program a future timed event such as turning the Macintosh on or sending a specified single keystroke combination. Careful setup (frequently in conjunction with a program such as QuicKeys or Tempo II) can make this single action trigger a wide range of events such as unattended tape backups or modem transmissions. The actual PowerKey has four surge-protected sockets (the SE needs one of them). It's not a must buy for SE owners, but it's certainly a nice addition to have.

Sophisticated Circuits, 19017 120th Ave. N.E., Suite 106, Bothell, WA 98011-2571; (206) 485-7979. Software version 1.0. $99.

6 ZTerm ····················· ♣♣♣♣

There have always been good cheap telecommunications programs. ZTerm continues the string that began with MacTEP and included many versions of Red Ryder. Although ZTerm is a low-cost shareware package, it's rich in features, giving away precious little (except for a scripting language) to its commercial competitors.

The interface is nice and intuitive. Xmodem, Ymodem (at both 128K and 1K block sizes), and Zmodem transfers are possible. Zmodem is very efficient, but the only other Mac telecom program that supports it is the latest (expensive) version of MicroPhone II. The Zmodem implementation in ZTerm isn't perfect yet, but it's frequently very handy. ZTerm has a simple macro ability (up to ten macros are permitted), a capture buffer, keyboard buffering, and dialing setups.

Performance is excellent. ZTerm is best for people with some telecom experience, but even beginners should be able to use it. With shareware like this around, you don't have to spend much for telecom.

Dave Alverson, 5635 Cross Creek Court, Mason, OH 45040. Version 0.85. Shareware: downloaded, $30; on-disk, $40. Available for download on Zmac, the on-line companion to MacUser.

7 Easy Color Paint ··· ♣♣♣♣

Basic 8-bit (256-color) paint programs abound. Easy Color Paint is a low-cost, rather basic example of the genre. It can print to color QuickDraw printers. Four color palettes as well as two pattern palettes are available. Each of the pattern palettes has 38 patterns, and one palette is totally user-definable with a well-designed editor. All the standard tools are here. An eyedropper tool, like the one in Studio/8, lets you pick up and match existing colors. The drawing windows are resizable, and the program can handle PICT2 documents.

Easy Color Paint is exactly that: easy. It doesn't have all the bells and whistles, but it offers good performance for a very low price. It's lucky that it's easy to use, because its manual is pretty bad. For simple work, it's a pleasure.

Creative Software, 55 Clinton Ave., New Providence, NJ 07974; (201) 665-9361. Version 1.1. $79.

8 Rival ····················· ♣♣♣♣♣

Rival is an INIT (with cdev controls) that inspects files for known viruses when the files are selected for use. This method is sure yet unobtrusive. Although Rival checks files constantly, I've rarely noticed a Rival-caused delay — even when I've launched large applications — and all delays have been brief. The only way you even know Rival is working is that it puts a box around the Apple in the menu bar. This slick program is more than a virus preventer; it can also scan disks and do some repairs.

Rival caught all my samples of known viruses and behaved very well at all times. Users can easily add protection against newly discovered viruses. It also passes one of my primary tests for a virus protector: nonintrusiveness. Rival has replaced SAM as my preventer and checker of choice.

Microseeds Publishing, 7030-8 W. Hillsborough Ave., Tampa, FL 33634; (813) 882-8635. Version 1.0. $99.

9 CopyFlow ····················· ♣♣♣♣

One of the few real drawbacks of QuarkXPress has been the need to replace each text and graphics item manually during the page-assembly and -revision process. CopyFlow is a QuarkXPress XTension that allows batch importing and exporting. It adds its own menu to QuarkXPress. When batch-importing or -exporting, you begin by naming all text and graphics elements. Then CopyFlow takes over and automates placement after you've completed your revisions.

CopyFlow works well and can be a real time-saver in shops where QuarkXPress is heavily used. It's no bargain, however — even at its recently reduced price. In fact, it's priced well out of reach of part-time and casual QuarkXPress users. That's a shame, because it really is useful.

North Atlantic Publishing Systems, P.O. Box 682, Carlisle, MA 01741; (508) 250-8080. Version 2.0. $395.

⑩ Cribbage King/Gin King .... 🦈🦈🦈🦈

If you're a cribbage or gin-rummy fan, you'll love these excellent electronic versions. Both games have seven skill levels (Shark is the toughest) and can challenge even the best players. The graphics are superb (you'll be able to recognize the card designs — they were licensed from the original publisher), although there's no color support. Play mechanics are simple. A tutorial feature makes learning the games easy. Seven levels of tutoring and several rules options are available. Excellent manuals offer strategic advice as well as cogent explanations of the rules.

On the minus side, performance is unacceptably slow on Pluses and SEs, and it's copy-protected.

Distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; (415) 571-7171. Version 1.2. $39.95.

⑪ SharpenUp .... 🦈🦈🦈🦈½

Laser printers generally print quite well, but many print routines don't extract all the quality possible from today's printers. SharpenUp is an INIT/cdev combination that automatically adjusts the relative width of lines, the texture of gray patterns, and the overall brightness of pages. It has no effect on text and bitmapped or EPS graphics, but it can spectacularly improve the quality of lines in tables in Word 4 or of cell outlines in Excel.

Combinations of effects are called styles. SharpenUp comes with a nice set of predefined styles, and users are able to easily create custom ones with the built-in style editor. In the places where SharpenUp works, it is spectacularly effective.

Somak Software, 535 Encinitas Blvd., Suite 113, Encinitas, CA 92024; (619) 942-2556. Version 1.0. $99.

⑫ VersaTerm-PRO .... 🦈🦈🦈🦈½

The PRO in VersaTerm-PRO indicates power, not level of difficulty. VersaTerm-PRO and its fewer-featured cousin, VersaTerm, have long and rightfully been known for their superb mainframe- and minicomputer-emulation abilities, and they are the choice of many power telecommunicators. The latest version of PRO is the first telecom package to use Apple's Communications Toolbox, with its add-on modules. This version includes a Serial module and is ready for all new connection and file-transfer tools.

Also available are "pop-up" keyboards that let users effectively use terminals that require far more extensive keyboards than they physically have. Xmodem, Ymodem, and Kermit file transfers are fully supported. About the only major telecom feature missing is an extensive command or scripting language.

Performance is excellent — even better than that of earlier versions. VT220 support is just about perfect, as is Tektronix 4105 and 4014 support. If you don't have to have fully automated operation, VersaTerm-PRO is worth a look. A solid, functional, and versatile telecommunications package like this is a necessity.

Synergy Software, 2457 Perkiomen Ave., Reading, PA 19606; (215) 779-0522. Version 3.1.1. $295.

⑬ Canned Art: Clip Art for the Mac ... 🦈🦈🦈🦈½

Canned Art — written and compiled by Erfert Fenton and Christine Morrissett — is a book that's a great productivity enhancer. Most of the book is a visual catalog of more than 15,000 currently available images. Most images are reduced, so quite a few fit on a page. The denser images fill in, but enough of each of them shows that you can judge their usefulness for your work. Being able to scan this huge collection can result in better work on your part, at a fraction of the time and cost of getting and hunting through all the actual material. There's also a detailed, excellent index.

The book has sections on file formats, copyright matters, art organizers, and vendor data as well as coupons offering savings of more than $1,000 on future clip-art purchases. If you use clip art more than once a month, *Canned Art* will quickly pay for itself — and just think of the time you'll save.

PeachPit Press, 1085 Keith Ave., Berkeley, CA 94708; (800) 283-9444 or (415) 527-8555. $29.95; sample disk, $10.

ColorPage™ T16 all business display.
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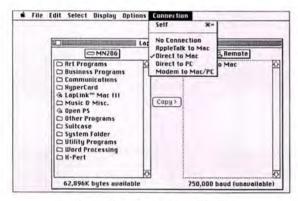
When you've got the world's top rated Mac II display, all you can improve is the price! ColorPage T16 from E-Machines now offers Macintosh business professionals the best for even less — the ultimate combination of compact size and big-screen impact, just judged #1 again by MacUser LABS. You get a whopping 70% more working space than on a 13" Apple. Don't settle for less when now you can afford the productivity of a full page color display. Call 1-800-34-GRAPHIC for your nearest dealer. Or write E-Machines, 9305 SW Gemini Drive, Beaverton, OR 97005.

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StartUp

Pinstripe Picks

By Robert R. Wiggins

Menu bar: File Edit Select Display Options **Connection**

Connection menu:
- Self ⌘=
- No Connection
- AppleTalk to Mac
- ✓ Direct to Mac
- Direct to PC
- Modem to Mac/PC

Window contents (MN286):
- Art Programs
- Business Programs
- Communications
- HyperCard
- LapLink™ Mac III
- Music & Misc.
- Open PS
- Other Programs
- Suitcase
- System Folder
- Utility Programs
- Word Processing
- X-Pert

Copy >   Remote

62,896K bytes available   750,000 baud (unavailable)

LapLink Mac III

♦♦♦♦½ If you passed up earlier versions of LapLink Mac because of the clunky interface that required the use of MS-DOS commands, it's time to look again. LapLink Mac III (see "From Here to There and Back Again" in the Bridges section of this issue) isn't just for Mac to DOS anymore. It's also a Mac-to-Mac program with a full Mac interface and a special cable capable of 750-Kbps transfers between Macs. (By comparison, AppleTalk speed is only 230 Kbps.)

LapLink Mac III is all new. It comes with two manuals: the *Mac-to-PC User's Guide* and the *Mac-to-Mac User's Guide*. The big news is that for either type of transfer, you have complete control from either side of the transfer. LapLink Mac III's Mac software can control a PC transfer or a Mac transfer. You still get PC software, and it can still run the transfer. The PC software, considerably improved from version 2, now has menus and dialog boxes that make it much easier to use.

But the real excitement is on the Mac side. In addition to the Mac interface, LapLink Mac III comes with an INIT that gives you background access to your Mac's files even when LapLink isn't running (it's similar to Timbuktu/Remote's file-transfer functions). LapLink Mac III keeps a remote-access-activity log for you, so you can see who's dropping by your computer (although it doesn't record what they did). You can also password-protect your Mac globally for read/write or read-only access, or you can "publish" folders to restrict people to a subset of your data. You can even set up "drop folders" where people can leave you files without being able to read any of your files. LapLink Mac III also now offers directory sorting, a find capability (by name and/or date ranges), and display filters to show or hide matching files.

LapLink Mac III is a completely different product from previous versions and deserves a second look.

Traveling Software, 18702 N. Creek Parkway, Bothell, WA 98011; (800) 662-2652. Version 3.0. $189.95.

Portable Attache

♦♦♦♦ The Portable Attache is an attractive alternative to the standard Portable case. Manufactured by Zero Halliburton, it's made of aluminum; is approximately the same size as the Mac Portable case; and comes with a handy accessory case (the perfect size for the Diconix printer) that fits inside, atop the Portable. The file pocket in the Portable Attache detaches from a Velcro strip and turns inside out to become a portfolio, and it can act as your briefcase while you're on the road.

The Portable Attache is a good choice. Its only real flaw is the locking mechanisms, which need to be tightly closed to function. It's sometimes hard to get the closure they require, especially when all your Portable accessories are inside (the accessory compartment gets in the way). But this is only an annoyance, and repacking the case or shifting things slightly usually clears up the problem. The only other drawback is that the Portable Attache is not suitable for checking on an airline (but neither is the standard case). Halliburton does makes the Portable Attache/Transport case ($369.95, also available exclusively from EDC), which can be checked.

EDC, 13101 Washington Blvd., Suite 110, Los Angeles, CA 90066; (213) 578-9712. $329.95.

The Madson Portable Case

♦♦♦♦½ Michael Madson took one look at Apple's case for the Mac Portable and immediately saw an opportunity. Apple's case, like the Portable itself, is big and clunky.

With the Madson line, you don't have to remove the Portable from the case to use it. Just unzip the sides and pull the Velcro flap open, and your Portable screen can easily swing open. (A staffer at our sister publication *MacWeek* has even mastered the art of playing the Portable like an accordion, using this case hanging around his neck.)

The only drawback is the lack of extra storage space. There is a zippered pocket on the back (or bottom when the Portable's in use) that can hold papers and manuals, and there are two small zippered pockets on the front (or top). But none of these pockets is appropriate for carrying the AC adapter, for instance, so additional luggage is necessary for all those Mac Portable accessories. (The Apple case the Portable comes in makes a fine accessory case and acts as a decoy for luggage thieves.)

The Madson Line, P.O. Box 338, Corte Madera, CA 94925; (415) 927-3600. $90.

Diconix M150 Plus Printer

♦♦♦♦ About the size of a small hardcover book, the Diconix M150 Plus printer is a fully functional inkjet printer. (GCC Technologies' WriteMove printer is an earlier model of the Diconix.) It's truly portable and even runs on batteries (which fit inside the platen roller in an excellent double use of space).

The Diconix is easy to set up and use. In fact, the hardest part of the installation process is configuring Adobe Type Manager, which is included. Paper loading is a relatively straightforward procedure.

You may want to check out some of the accessories available from Kodak too.

The five rechargeable C batteries are optional, as is the delightful tiny printer stand (which doubles as a printer cover during transport). A carrying case and an international power-supply adapter are also available. The Diconix isn't a PostScript printer, although it comes bundled with ATM, which lets you use PostScript fonts and have them print beautifully. The maximum print width is a relatively narrow 7.1 inches. The paper feed isn't always completely smooth, resulting in occasional gaps in lines

of characters. The software, especially ATM, is also fairly memory-intensive and takes up at least 274K — a substantial bite out of a 1-megabyte Mac Portable.

Despite its flaws, the Diconix printer is capable of producing very attractive output, surpassing that of most impact printers and sometimes approaching laser quality. If you're on the road, the Diconix M150 Plus is an excellent choice.

Eastman Kodak Co., PPP Customer Information Center, 901 Elm Grove Road, Rochester, NY 14653-6224; (800) 344-0006. $699.

Remote Access Pack

♦♦½ The Remote Access Pack is a bundle of Farallon communications products intended to facilitate remote communication with your main Mac system. Included in the bundle is a V.32 9,600-bps modem, a Remote/WakeUp cable with Auto ShutDown software (see Bobker's Dozen in this issue), Timbuktu, and Timbuktu/Remote. Of course, you need another Remote Access Pack (or the relevant hardware and software components) at the other end in order to communicate.

It's a great idea. When your Portable is in the same room as your base system, you connect them via AppleTalk and use Timbuktu to transfer files. When you're out on the road, you use Timbuktu/Remote to call back in to your base system. The WakeUp cable attaches the modem to the serial port and also plugs in to the ADB port, so when the phone rings, your base-system Mac is turned on automatically. You then use Timbuktu/Remote to control your base system and can transfer

files back and forth. When you've finished, you might forget to shut down the base system, but never fear: Auto ShutDown handles that for you.

The only problem with this implementation is the modem that comes with the Remote Access Pack. It's big, bulky, and not particularly light. Not intended to be portable, it has no provision for battery power. Because it's a V.32 modem and transfers data at 9,600 bps, full-duplex, it's very sensitive to line quality — in dozens of tries, I got a successful connection only twice. When you're calling long-distance, having to make multiple attempts to connect can be expensive (not to mention annoying, as the sounds this modem makes when attempting to connect are very hard on the ears).

Farallon has a great concept here, and with a better modem, this would be an outstanding package. Since the modem is the weak link, you might want to consider buying Timbuktu, Timbuktu/Remote, and the WakeUp cable separately and provide your own modems (I got excellent results with Hayes V-Series 9,600-bps modems). You'll want the fastest modems you can get, since Timbuktu/Remote must transfer a great deal of information to function.

Farallon Computing, 2000 Powell St., Suite 600, Emeryville, CA 94608; (415) 596-9000. Version 2.0.5. $1,295.
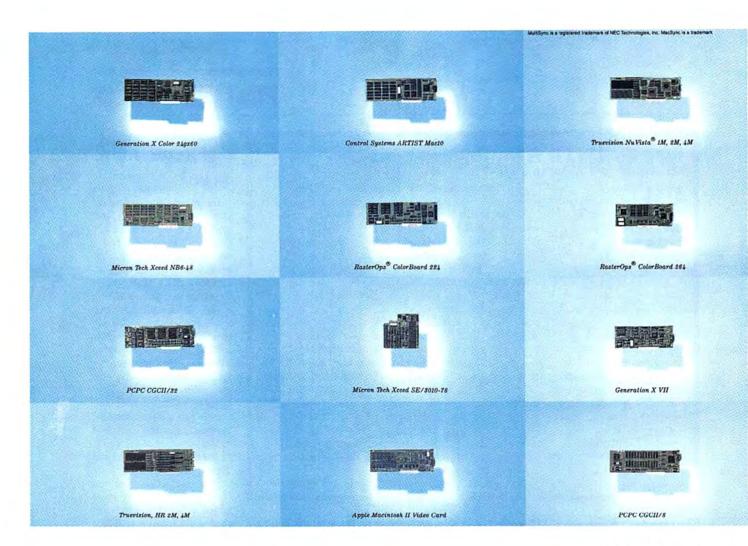
Portable Pack

♦♦♦♦ If you've ever sat in a hotel room trying to figure out a way to connect your modem to the hotel phone system, the Portable Pack is for you. It's a veritable Swiss army knife of communications connections. It even includes a customized Swiss army knife for clipping and crimping wires. Also included are two PhoneNET StarConnectors, two RJ-11 modular phone cables, two modular cable extenders, two modular Y-splitters, a screwdriver, alligator clips, a PhoneNET-to-LocalTalk adapter cable, and even a 3-to-1 power strip, all in a handy carrying case. And if that's not enough, you'll find a copy of Timbuktu and Timbuktu/Remote.

The true wonder of the Portable Pack, though, is its Quick Reference, which includes a decision chart. Based on where you are (home, hotel, or office and with or without Timbuktu) and what you want to connect to (modular phone system, modified modular phones, nonmodular phones, PhoneNET, LocalTalk, or another Macintosh), you select one of the descriptions and follow the directions. The decision chart lists nine solutions, but only eight are detailed. The missing ninth, connecting to a nonmodular phone system, unfortunately also happens to be the most difficult.

The Portable Pack is a marvelous collection of tools for the road. The only drawback is the price: If you already have copies of Timbuktu and/or Timbuktu/Remote, it's very steep. But although you could assemble a similar collection of wires and tools, it's certainly a lot easier to pay Farallon to do it for you.

Farallon Computing, 2000 Powell St., Suite 600, Emeryville, CA 94608; (415) 596-9000. $495.

Generation X Color 24gx60

Control Systems ARTIST Mac10

Truevision NuVista® 1M, 2M, 4M

Micron Tech Xceed NB6-48

RasterOps® ColorBoard 224

RasterOps® ColorBoard 264

PCPC CGCII/32

Micron Tech Xceed SE/3010-78

Generation X VII

Truevision, HR 2M, 4M

Apple Macintosh II Video Card

PCPC CGCII/8

All major
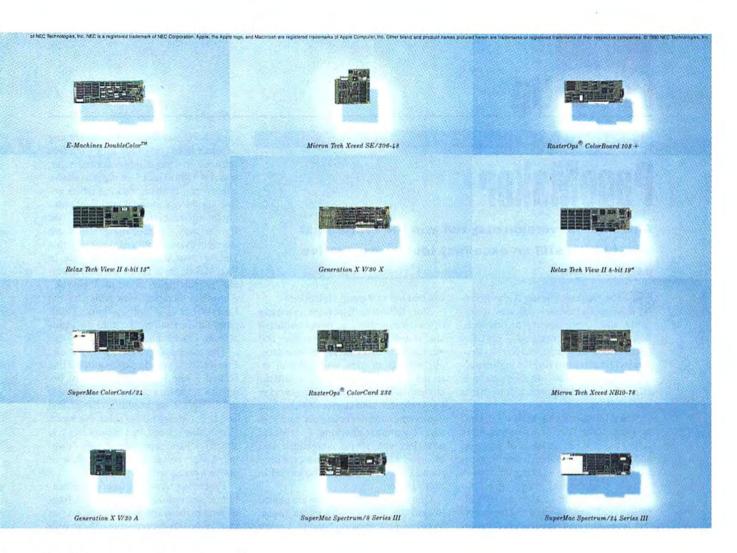
Not an unusual claim for a 4-star restaurant. But for a monitor, it's quite a story. With NEC's multiple-frequency technology, our monitors can accept all kinds of video cards for applications ranging from standard desktop software to large-screen graphics design. And your NEC dealer has several different Macintosh-compatible MultiSync® monitors he'd be glad to show you. In fact, he might even take plastic.

MultiSync GS2A *Superior gray-scale monitor, 14" flat-surface screen. Supports the Macintosh II video card and compatibles. Ideal for desktop publishing.*

MacSync™ Series *Designed exclusively for Macintosh II video card and compatibles. Available in both non-glare and new high-contrast 14" screens.*

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SuperMac ColorCard/24

RasterOps® ColorCard 232

Micron Tech Xceed NB10-78

Generation X V/30 A

SuperMac Spectrum/8 Series III

SuperMac Spectrum/24 Series III

cards accepted.

MultiSync 3D *Supports Macintosh II card and compatibles. Advanced microprocessor digital controls. 14" screen. Perfect for multimedia applications.*

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MultiSync 5D *Resolution from Mac II card and compatibles up to 1280 x 1024 on a 20" screen for graphics design. Microprocessor digital controls.*

NEC

For literature call NEC at 1-800-826-2255. For details call 1-800-FONE-NEC. In Canada, call 1-800-268-3997.

PageMaker

Aldus' latest version may not win the feature-list war, but it's still an excellent tool for productive page design.

The challenge facing Aldus in creating PageMaker 4.0 was formidable: adequately meeting the competition — current and imminent — posed by Quark, Letraset, Frame, and Xerox (Ventura) while still satisfying the high expectations of an enormous installed user base, all hoping to see their particular wish lists incorporated.

When I first saw PageMaker 4.0, I had two questions: Was Aldus successful in achieving a broad balance of features, and was it able to fit the 75 new features within PageMaker's existing framework without complicating the program for average users? The answers are both affirmative. There is something for everyone here. The new version may not address all the needs and wants of every particular group, but the range of improvements is impressive enough to please many — if not most.

PageMaker's greatest asset has always been its accessibility. Version 4.0 is as easy to use as previous versions, since Aldus has retained the pasteboard metaphor. Its most significant advances are in word processing, typography, graphics, links management, long-document processing, color, and table processing.

WORDS AND TYPE PageMaker 4.0 comes with a word processor called Story Editor. This is the most significant advance in desktop page layout. Triple-clicking on any story within PageMaker opens that story in the built-in word processor. Story Editor is no Microsoft Word, and it doesn't try to be. Nevertheless, it is quite powerful. The ability to read and edit a story in a word-processing view saves a lot of time, since editing in the layout view forces a full-screen redraw with every change. With Story Editor, you can edit away without slowing down. You can even display an article in Story Editor in the typeface and size of your choice, without affecting the story in the layout — so, for example, you can view your story in 14-point Stone Serif, even though

it's laid out in 9-point Helvetica.

Story Editor can display the style name of each paragraph in a column on the left side as well as search for and replace text strings. It can also operate on formatting attributes (font, size, and style) in selected text, a single story, or all the stories in a document. Its spelling checker lets you check your stories with multiple dictionaries and has been bolstered with simple grammar checking. PageMaker now lets you rotate unthreaded text blocks in 90-degree increments, and once rotated, the text can still be edited in Story Editor.

Quite a few improvements are geared toward the typographers in our midst. You can now specify type in .1-point increments, from 4 to 650 points. Leading is specifiable in .1-point increments as well. PageMaker supports only proportional or top-of-caps leading; baseline leading is still not supported. If you are into condensed or expanded type, PageMaker 4.0 lets you do this in 1-percent increments from 5 to 250 percent.

Kerning is crucial in typography. PostScript permits four kinds of kerning: manual kerning, automatic (pairwise) kerning, letterspacing, and track kerning. PageMaker 4.0 lets you use any or all of these options. Manual kerning has been improved significantly and can be applied to a selected pair or a range of selected characters. It can also now be applied as a character attribute to spaces after a character. In PageMaker 3.0, manual kerning was not cumulative with automatic kerning. It now is.

Automatic kerning, based on kerning-pair values built into the FOND resource of the screen fonts, is still available. Letterspacing and word spacing have been improved in this version. Spacing in PageMaker 3.0 could be applied only to the whole story; you can now apply spacing settings to each paragraph.

PageMaker 4.0 introduces a fourth kind of kerning — track kerning. You

can either choose to have no track kerning or select from one of the following five settings: very loose, loose, normal, tight, and very tight. Track kerning is a relative adjustment. Built-in tracking tables define good loose, normal, and tight spacing for different sizes of a particular font. By the way, track-kerning tables are stored in those ubiquitous AFM files that you've never known what to do with. In PageMaker, these tables are used to create "standardized adjustment curves." Aldus has included track tables for the LaserWriter II's built-in fonts. Third-party utilities and track tables are available for other fonts.
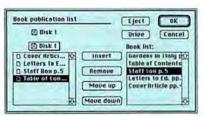
The paragraph rule is a nifty feature. Previously, if your layout required a line (called a rule in publishing lingo) beneath a subhead, you had to draw it with the line tool. A slight editing change, and you had to move all the rules. No more. PageMaker's latest incarnation lets you specify a paragraph rule of user-designated size, color, and width, below or above a paragraph.

PageMaker now has forced justification as one option. If it is selected, lines expand to the width of the block, so you can create some interesting effects with headlines. Hyphenation is now much more powerful. Three kinds of hyphenation — manual, dictionary, and algorithmic — are supported, and the number of consecutive hyphens is user-configurable. The Indent dialog box has also been improved. PageMaker can now highlight tight or loose lines at your request. Pressing Shift-Return in Microsoft Word creates a new line within the same paragraph; PageMaker lets you create similar lines with Command-Return. Widow and orphan control is available, but it's somewhat limited.

PICTURES, LINKS, AND MORE Version 4.0 has significantly enhanced graphics handling. One of my favorite improvements is the Inline graphics feature, which lets you anchor a graphic to a specific piece of text. You can select an Inline graphic either as text or as an object. If it's a text item, you can align it and apply many standard text-formatting features (leading, kerning, tabs, and so on); if you select it with the pointer tool — that is, as a graphic — you can make many of the usual graphic modifications. An Inline graphic is neither a text item nor an independent graphic, however, so you don't always have the same flexibility you would with the genuine article.

PageMaker 4.0 may not include every feature on the most-wanted list, but it's still an excellent designer's tool. Story Editor, a built-in word processor, is a major addition. You can write and edit in Story Editor, view each paragraph's style-sheet name on the left, and even view your articles in one font and size while laying them out in another.

PageMaker 4.0 is a superb application for long documents. You can create a book list that specifies the different PageMaker documents that will comprise your book, and the order they will be in. PageMaker can then chain print or create a table of contents or an index for all the documents.

One feature that will make a lot of people happy is PageMaker's ability to wrap text around a master item. The lack of this ability used to be my biggest gripe with the program.

With its Links feature, PageMaker has introduced a rudimentary work-group publishing capability. Links keeps track of imported documents. The Link Options dialog box gives you the choice of updating your improved document once the source document has been modified, so you can import a rough sketch of a graphic and flow your text around it while your Mac artist continues refining the image. I fell in love with the Links dialog box. It gives you a listing of all the imported files, their type (TEXT, PICT, EPS, and so on), and the page they are currently on. Aldus has also created some icons to give you a quick overview of each file's status.

When it comes to long-document processing, PageMaker leaves its competitors in the dust. Version 4.0 lets you create a book list that specifies the different PageMaker documents that will comprise

the book and the order in which they will be. It can then chain print or create a TOC (table of contents) or an index for all the documents in this book list. Of all the programs available for the Mac, PageMaker makes TOC and index generation the easiest.

PageMaker now incorporates PageMaker Color Extension — formerly a separate ($195) utility — and takes it one better. Version 4.0 lets you place 8- and 24-bit-color TIFF images, prints to color PostScript printers, offers Pantone color, and outputs separations with OPI comments. To create process-color separations, you still need a third-party utility such as Adobe Separator, but Aldus is soon due to come out with Aldus Pre-Print, a dedicated separation utility that should bring a lot of high-end separation capability to the desktop.

A table-editing program, called Table Editor, now comes bundled with PageMaker. This program lets you export tab-delimited text or a PICT representation of your table. The PICT version can then be resized within PageMaker to fit your allotted space. Unfortunately, direct support of Word 4.0's tables isn't available.

PageMaker 4.0 also adds power to your pasting capabilities. If you paste with the Option key down, the item is pasted into the same position it occupied on the original page. Option-paste also lets you place copies at a certain specified distance from the first Option-pasted item.

THE BOTTOM LINE PageMaker 4.0 is an exciting upgrade to a solid product. Current releases of QuarkXPress (version 3.0 was still in beta testing at this writing), Ready,Set,Go!, and DesignStudio offer some features that either are not implemented in PageMaker 4.0 or do not

offer the same functionality or precision. Nevertheless, PageMaker 4.0's elegant user interface, long-document-processing capability, work-group functionality, and Story Editor are well ahead of the competition.

MacUser's troop of PageMaker testers encountered several quirks in version 4.0's auto-flow, minisave, and text-wrap functions. For example, the auto-flow function occasionally skipped an entire column, and the text wrap resulted in doubled-up characters in a narrow column. As auto-flowing and text wrap usually need to be touched up manually anyway, neither of these shortcomings is likely to be more than a minor nuisance. Still, we expect more from an industry standard. None of the bugs were reproducible, however, and the product performed reliably in typical production environments.

If features were all that counted, PageMaker 4.0 would probably lose an outright feature-list war. But in real-world situations, what counts isn't the size of an application's feature list but how productive it makes its users. On this score, PageMaker 4.0 comes out a clear winner. For example, it still can't open multiple documents, but as most designers don't work simultaneously on multiple layouts and as PageMaker 4.0 lets you import material from other layouts, this is a "missing" feature that's a nonissue for most designers. Another missing feature is the ability to lock or group elements of a template.

If features are what count with you, take a close look at QuarkXPress (version 3.0), DesignStudio, FrameMaker, and Ventura Publisher (Mac versions of the latter two should be available around the time you read this) before you make your decision. If, on the other hand, what counts is productivity, there's no reason to wait. PageMaker 4.0 is your best bet.
— **Jim Quraishi**

Get Info

PageMaker ♦♦♦♦
Published by: Aldus, 411 First Ave. S., Seattle, WA 98104; (800) 638-5078 or (206) 628-2320.
Version: 4.0.
List Price: $795; upgrade from any previous version, $150.

OmniDraft, OmniSpell, and OmniProof

Caere's first raft of OCR utilities includes a big winner, a big loser, and a big question mark.

OmniPage is one of the fastest, easiest, and most accurate optical-character-recognition (OCR) programs available (see "Character Witnesses," July '90, page 120). Although it has heavy hardware requirements (4 megabytes and at least an SE/30), it's really the only way to go if you're serious about OCR.

Riding on the recent popularity of OmniPage, its manufacturer, Caere, has released several add-on packages aimed at making a good product better. To date, three of these add-ons — OmniDraft, OmniSpell, and OmniProof — have been released.

OMNIDRAFT Like all OCR programs, OmniPage often has a hard time recognizing letters printed on dot-matrix printers (such as the ImageWriter). This is because those printers make characters dot by dot. In draft modes, these dots often don't overlap, leaving discernible gaps that tend to make text recognition difficult.

OmniDraft is an add-on product that greatly improves OmniPage's ability to recognize dot-matrix characters. It does this by intelligently connecting the dots (in memory) before it transfers the job to OmniPage for character recognition. Once installed, OmniDraft becomes part of OmniPage itself and adds a check box for dot-matrix-text recognition. (OmniDraft works only with OmniPage 2.1 or later.) You check the box and scan as usual. It's that easy.

And the results are amazing. Whereas before it was rarely worthwhile to scan any but the highest-quality dot-matrix printouts, now you can realistically expect to have a fairly accurate scan every time. Not only does accuracy improve with OmniDraft, but speed is also dramatically increased, because OmniPage has to spend far less time trying to discern

the shape of the characters. As the figure illustrates, you still may have to do some cleanup, but that's usually far preferable to retyping your document manually.
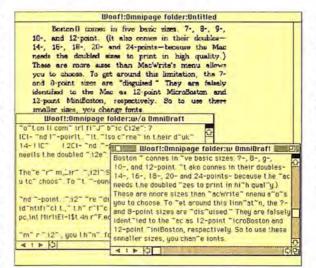
If you ever have to do OCR with dot-matrix printouts — especially ones of draft or low quality — you'll want to use OmniDraft. It's too bad that Caere decided to offer OmniDraft as an add-on instead of incorporating it into the next version of the core product. Adding

another $100 to a $795 product is getting pretty steep. But for my money, I wouldn't buy OmniPage without it.
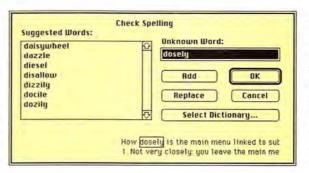
OMNISPELL In a nutshell, OmniSpell is as bad as OmniDraft is good.

OmniSpell is an integrated spelling checker. Once installed into OmniPage 2.1, it makes available several spelling commands on the Edit menu so you can check for errors once you've scanned your document. OmniSpell works only with OmniPage 2.1 or later.
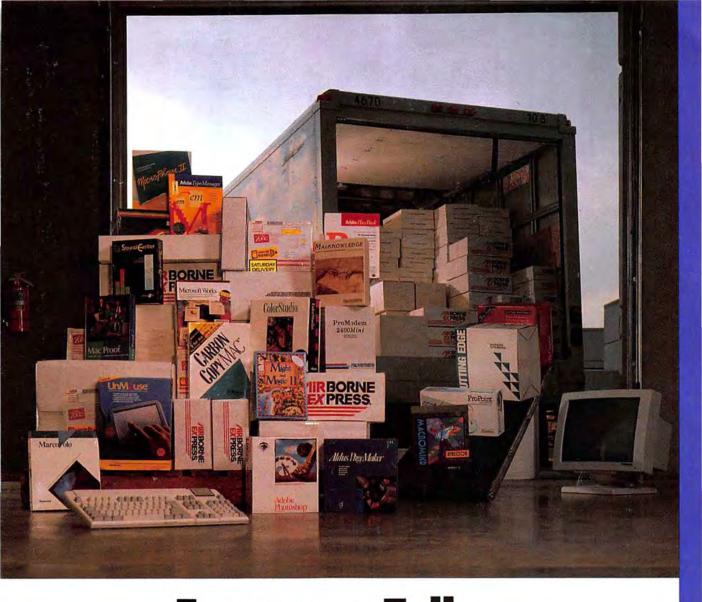
As anyone who has used OCR software knows, a spelling checker is an essential element of the process. But the question is, why would you want to use OmniSpell instead of your favorite spelling checker in your word processor? The purported answer is that OmniSpell is specifically fine-tuned for the kinds of errors that tend to occur in OCR documents. For example, the manual correctly points out that conventional spelling checkers would rarely understand a typo that substituted cs for es, since the letters aren't near each other on a normal keyboard. In OCR, however, the substitution can easily happen, since

OmniPage, Caere's top-notch OCR software, did a miserable job of interpreting this poor-quality dot-matrix paragraph (top) when OmniDraft was not used (middle window). With OmniDraft, however, the results are much better, though still far from perfect.

OmniSpell could not figure out that *dosely* should be *closely*, even though *d* substitutions for *cl* are common in OCR scans. To make matters worse, the context lines are sometimes clipped off the edge of the dialog box.

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300mb turbo	1,995.
600mb turbo	2,995.
Removable Media/ Infintity	
40mb turbo	997.
40/40mb turbo	1,870.
Optical	3,995.

SyQuest
Removable Media	
44mb cartridge	84.

STORAGE MEDIA

Fuji Disks
DS/DD 10 pk Rainbow	12.
DS/DD 10 pk	11.
HD 10pk	20.
HD Rainbow 10pk	21.

Maxell Backup Tapes
150 Mb Tapes	24.
60 Mb Backup Tape	19.

Sony Backup Tapes
DC 2000 40 Mb. Tape	19.
QD-600A data cartridge for 150 tape back-up	21.

Sony Disks
Double Sided 10pk	13.
Bulk DS/DD (50 pk)	39.50
HD (1.44 mb)10pk	22.
Bulk HD (50 pk)	90.

INPUT & OUTPUT DEVICES

Abaton
Pro Point ADB (SE & II)	79.

Advanced Gravis
MouseStick	64.
MouseStick (ADB)	84.

Altra
Felix	125.

Datadesk
Mac 101 Keyboard	125.
Switchboard	174.

Kensington Microware
Turbo Mouse	108.
Turbo Mouse ADB	108.

Keytronics Keyboard
Mac Pro Kb-105 ADB	125.

Kraft
QuickStick (512k & Plus)	39.
QuickStick ADB	49.

Kurta - Is/ADB Tablets
Cordless 4 Button Cursor	64.
8.5" x 11"	254.
12" x 12"	384.
12" x 17"	624.

Logitech
Scan Man 32	336.

MicroSpeed
MacTRAC ADB	75.
MacTRAC 512/+	65.

Microtouch
UnMouse	188.

MSC Technologies
A+ Mouse (512k & Plus)	58.
A+ Mouse ADB	64.

Olduvai Software
Read-It! Personal 2.1	134.
Read-It! OCR 2.1	245.

Summagraphics Bit Pad Plus
12" x 12" Tablet - ADB	315.

The Complete PC
Half Page Scanner/400	314.
Full Page Scanner	758.

Thunderware
Lightning Scan	368.
ThunderScan 5.0	184.

ACCESSORIES

American Power Conversion
UPS 110SE	208.

Avery Labels
Diskette	
ImageWriter 3 1/2" (250)	12.
Laser 3 1/2" (630)	28.
Address	
Clear 3 1/2"x15/16" (500)	11.
Transparencies	
8 1/2"x11" (50)	22.

Byte Brothers
Care-Free Security Kits-	
for Mac 512K & Plus	26.
for Mac SE, II & IIcx	26.

Casio
Casio B.O.S.S.	219.
CasioLink/Mac	98.

CoStar
LabelWriter	194.

Ergotron
MacTilt	68.
Mouse Cleaner 360	9.

Farallon
MacRecorder 2.0	158.

Golden Ribbons
Multi Colored	6.
Brown, Blue, Green or Red	6.
Black	3.

Kalmar Designs
Teakwood Disk File Cabinet	
45 Disks	14.
90 Disks	21.
135 Disks	30.

Kensington Microware
Dust Cover SE	8.
Dust Cover SE w/ Sys Svr.	9.
ImageWriter Cover	8.
Anti-Glare Filter	32.
System Saver	63.
System Saver SE	52.
Universal Printer Stand	15.
LaserWriter II Security Kit	32.
Mac II Stand w/o cable	19.
Mac IIcx Monitor Stand	54.
Mac II Monitor Stand	64.
Mac II Mon. Cable Ext. Kit	32.
Masterpiece Mac II	105.
Extended ADB Cable	24.
Universal Copy Stand	22.
Tilt Swivel	21.
Printer Muffler 80	43.
Power Tree 10	19.
Power Tree 20	27.
Power Tree 50	54.
Apple Security Kit	34.
A-B Box (DIN-8)	63.
SE Rad./Anti-Glare Filter	51.
Apple Color Monitor	
Polarizing Filter	63.
SuperBase	31.

1-800-248-9948

the OCR program can easily overlook the crossbar of the *e*.
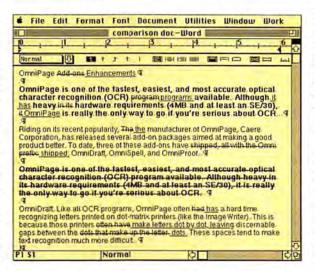
So, in theory, OmniSpell makes sense. All sorts of character substitutions happen in OCR that OmniSpell could be tweaked to handle and that other programs might not understand. At least, that's the theory.

In practice, OmniSpell does a miserable job of suggesting the correct word. For example, when presented with the word *bookkccper*, it failed to take its own manual's advice and suggest the word *bookkeeper*. (Microsoft Word's spelling utility did suggest the correct spelling, however.) Likewise, OmniSpell does not seem to know that an exclamation mark (!) is a common OCR error for a lowercase *l*, that *cl* is sometimes seen as a *d*, and that *a*s and *o*s are often confused. Another example: When *dosely* instead of *closely* appeared in my document, OmniSpell suggested *daisywheel*. Don't ask me why. These are precisely the kinds of errors that OmniSpell is advertised as being fine-tuned for. It should do better than this. Far better.

Plenty of other things are wrong with OmniSpell too. The dialog box is very poorly designed. You can't move it around, so it often obscures the text it checks (the dialog box does give some context, but it's often clipped). There's no Ignore button. The likeliest suggested word isn't chosen for you. And once a word has been replaced, the program doesn't remember the correction and suggest it for you after that.

OmniSpell has a 100,000-word English dictionary and a supplementary medical/legal dictionary. Foreign-language dictionaries are available as well. It also has an auto-substitution feature that can automatically "correct" misspelled words with what it thinks is the likeliest correction. I wouldn't suggest anyone use this feature, however, except perhaps at a party for a good laugh.

OMNIPROOF OmniProof is a document-comparison program, a licensed and remarketed version of DocuComp from Advanced Software (see review, December '89, page 80). What OmniProof does (as does DocuComp, for that matter) is compare any two versions of a file and give you a detailed report on the differences between the two — all the way down to different punctuation. It can show you where text has been moved, deleted, or changed. It can also print the document

with revision bars to show you graphically where editing has taken place.

This is all fine and good, but what does this have to do with OmniPage? It seems a bit of a stretch for Caere to call this a companion product. It's a separate program that works quite well, even if you've never heard of OCR. The main use of OmniPage along with OmniProof is to discover the differences between two printed documents by scanning them both in OmniPage and then comparing them in OmniProof. The only problem with this "scanario" is that in scanning them, OmniPage will likely acquire new errors, which will show up as changes even though they aren't.

Remember, you don't have to use OmniProof with OmniPage; it works fine all on its own. But if I needed a document-comparison program, I'd spend $159 ($9 more than OmniProof costs) on DocuComp itself, which should be out in a new version (1.5) by the time you read this.

THE BOTTOM LINE Caere is to be commended on its attempts to improve OmniPage. OmniDraft truly enhances OmniPage, as would OmniSpell if only it worked as advertised. OmniProof, on the other hand, is a solid product in its own right but seems to have very little to do with OmniPage in particular or OCR in general.

Caere has also announced, but not yet shipped, an add-on called OmniTrace. OmniTrace is advertised as a $150 tracing program that converts bit-mapped or TIFF images into editable Encapsulated PostScript format. The resulting EPS file can then be placed into other graphics applications or DTP programs.

OmniProof, a special version of DocuComp, can create a composite document by comparing two versions of a document and then combining them into one. Unfortunately, you must open this composite in another word processor rather than in OmniProof. This screen compares several paragraphs of two drafts of this article.

Unlike OmniProof, which has few obvious connections with OCR, OmniTrace is a logical addition to the Omni family. Taken together, OmniTrace and OmniPage provide a complete solution for getting the printed page — no matter what kind of material appears on it — into the computer without loss of fidelity or utility.

If OmniTrace does a better job than Adobe's excellent but overpriced Streamline, Caere might have another winner.
— **Dave Valiulis**

Get Info

OmniDraft ♦♦♦♦½
Published by: Caere Corp., 100 Cooper Court, Los Gatos, CA 95030; (800) 535-7226.
Version: 1.0.
List Price: $100 (requires OmniPage 2.1, $795).
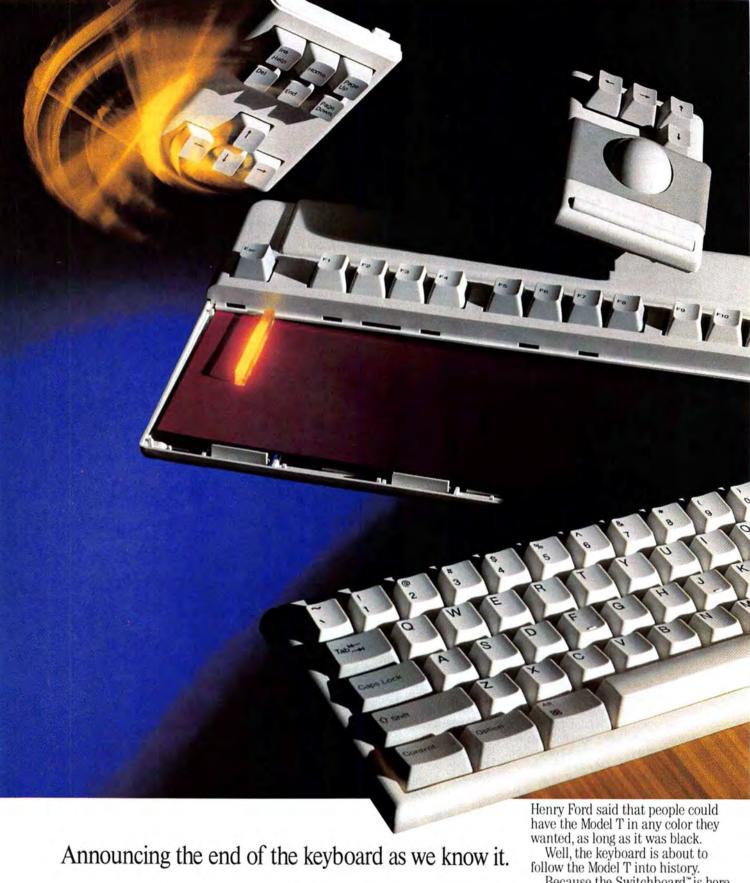
OmniProof ♦♦♦½
Published by: Caere Corp., 100 Cooper Court, Los Gatos, CA 95030; (800) 535-7226.
Version: 1.0.
List Price: $150.

OmniSpell ♦½
Published by: Caere Corp., 100 Cooper Court, Los Gatos, CA 95030; (800) 535-7226.
Version: 1.0.
List Price: $100 (requires OmniPage 2.1, $795).

Announcing the end of the keyboard as we know it.

Henry Ford said that people could have the Model T in any color they wanted, as long as it was black.

Well, the keyboard is about to follow the Model T into history.

Because the Switchboard™ is here.

The world's first user-configurable keyboard is a radical new product based on a very simple idea: That computers should adapt to the people who use them.

Instead of the other way around.

The unique modular design lets you arrange the Switchboard's layout in any configuration that makes you comfortable.

And the more comfortable you are, the more productive you are.

To make you even more so, Datadesk is introducing a family of additional modules for the Switchboard.

Including a trackball, a vertical set of 15 function keys, a 24-key module of programmable macro keys suitable for 3270 emulation, and a dvorak alpha pad.

And that's just the beginning.

Because we're at work on still more modules designed to make the Switchboard even more powerful— and more flexible.
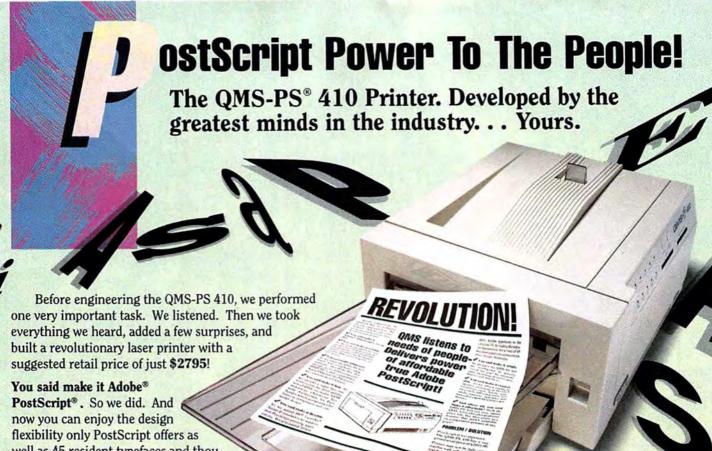
Speaking of flexibility, the Switchboard is the first keyboard ever to be compatible with *both* IBM® *and* Macintosh® computers.

Which makes it the only keyboard you'll ever need to know.

DATADESK

Publish It! Easy

Publish It! Easy proves that, in page layout, a low price doesn't have to mean low power.

Publish It! Easy is the less expensive cousin of Publish It!, Timeworks' midrange DTP application (see review, December '89, page 60). Although it retains many of its predecessor's desirable features, it eliminates some of the more advanced ones in exchange for a lower list price ($199) and a simplified, responsive interface.

LAYOUT UNFRAMED Unlike Publish It!, Publish It! Easy places your document on a pasteboard, as in PageMaker. You can use this space to hold objects and text not needed on the current page. You can set the rulers for inches, centimeters, picas, or points/pixels. As with most DTP programs, text and graphics are contained in frames, but shortcuts minimize the frame-drawing drudgery. To create any number of text frames on a blank page, you simply type a number in the Place Columns dialog box and Publish It! Easy automatically replaces any selected rectangular graphic shape with the number of text frames you've specified. The program also automatically draws frames around imported graphics.

Publish It! Easy offers the option of two main tool palettes (you can use either or both). One mimics PageMaker's Toolbox and the other Ready,Set,Go!'s. The PageMaker-style palette can zoom to reveal Publish It! Easy's full complement of drawing, painting, and layout tools, as well as controls for setting and displaying the currently selected line thickness, border, and fill patterns. Whether you just select an object or move it around the screen, the status palette displays the distance from each of the object's sides to the edge of the page and the object's height and width. This display is essential. Unlike those of other DTP programs, Publish It! Easy's rulers display marks only at the current cursor position, not at both edges of the object being moved.

The program supplements hierarchical menu commands with a new twist called the Library, an additional on-screen palette. Commands ending with an asterisk can be chosen either in the usual way or by clicking on them in the Library. Either way, the Library palette changes to display the associated submenu. You needn't hold down the mouse button, so the mouse is fully functional within the document. Clicking on any choice instantly applies it to your selection, and you can repeatedly click on choices to try them out. The Library works well except in the case of long font lists. The Font menu and Type Specifications dialog box scroll faster and more smoothly than the Library does.

Publish It! Easy's word processing is fairly robust and doesn't require changing to a separate "typing window," as in PageMaker or Springboard Publisher. For non-text-related actions, its Undo command works like that of most Mac applications. For text changes, however, the Undo command in the Library remembers and can undo or redo the last five changes you've made. The program uses

Publish It! Easy is a low-cost but high-powered page-layout package. This window shows the mock Ready,Set,Go! and PageMaker tool palettes and the Library palette. With all these palettes, however, real estate on a 9-inch screen can get tight.

This newsletter cover shows some of Publish It! Easy's features, including type manipulation, overlapping text frames, and text wrapping.

Writing unlimited.

The freedom to write and think is for all of us. Now, there is a new word processor that's just right for us, too. It's called MacWrite® II, and it's made by Claris. MacWrite II makes it possible to share your ideas and thoughts with other computers and word processors. You'll be free to open documents from over 50 word processors, on all kinds of computers, with all kinds of speech, and work on them without reformatting.

But there's more you can do. (The feature is called XTND.) You can import graphics, not only from Macs, but many computers, guaranteed. And you can scale and crop them, one and all, in your MacWrite II document. In short, MacWrite II with XTND is a powerful word processor that lets you freely exchange text and graphics. You'll find also that your MacWrite II lets you change fonts, styles, sizes and colors, as well as text with its find/change feature. And you can create custom styles and save them as stationery — with all formats preset. You'll share your reports and letters quickly.

But what good is freedom of expression if you find your editing to be a hassle? That's why the page layout and editing is fully WYSIWYG: the thoughts you see are the thoughts you get. This WYSIWYG feature, by the way, is found only with MacWriteII. It's another way Claris simplifies word processing for you, whether you're 52, 22, or 72.

Called upon daily MacWrite II smooths your writing assignments and other chores. There's MacWrite II spell checking, for example, and foreign dictionary programs that are optional, and a host of other features that come standard. (Like a thesaurus, and a mail merge feature you'll discover saves lots of time.)

What it adds up to, you'll find, is a simple and powerful tool designed for people. All the people. It is for writers, and it is for business people. And it is for those of us in between. The freedom to write is liberating. Now technology is, too.

CLARIS®

a combination of letter and word spacing to achieve attractive justified type.
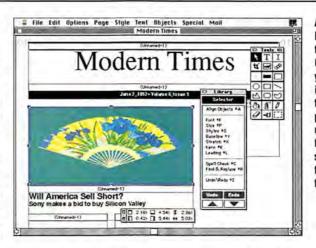
The spelling checker works either interactively or in batch mode. Batch mode can check an article or a whole publication. Although the spelling checker can suggest correct words, you can't add your own words to the dictionary — a backward step in spelling checkers! A handy thesaurus is included.

You can specify leading and kerning in even points. (A point equals 1/72 inch, or one pixel, on most screens). Selected type may be expanded or condensed from 25 to 400 percent. Type can appear in a pattern or gray level (1-percent increments). You can search for and replace strings of text, fonts, sizes, styles, patterns, and gray levels or any combinations thereof. Text and graphics can be rotated in 1-degree increments. Rotated text appears on-screen in the rotated position, but when you click on it with the I-beam cursor, it snaps back into its unrotated frame for editing.

Publish It! Easy has the standard object-oriented and bit-map graphics tools. The bit-map tools create only 72-dpi graphics, but they can edit imported high-resolution bit maps. The original Publish It! lacked the lasso selection tool, but Publish It! Easy supplies it if you hold down the Option key while clicking on the selection marquee. You can import PICT, color PICT (PICT2), MacPaint, black-and-white TIFF, and EPS graphics, but color and gray-scale TIFF are not supported.

FRAMES AND COLOR Publish It! Easy can wrap text around any graphic, but the graphic frame must be in front of the text frame for wrapping to occur. Because the text cursor cannot select text in a frame that's covered by another frame, it's nearly impossible to edit, apply hyphenation to, or spell-check wrapped text. To perform any of these functions, you can bring the text frame to the front, which unwraps the text; perform your operations; and then send the text frame to the back. Alternatively, you can make the text frame larger than the graphic frame, so a portion of the text frame is always uncovered.

The software works on color-equipped Macs, whether they're set to monochrome, 16.8 million colors, or anything in between. For text and graphics you create within the program, however, you can select only the eight basic Quick-Draw colors. Imported full-color PICT

Although Publish It! Easy supports only the eight basic QuickDraw colors, you can import color images, such as this fan. The status palette at the bottom of the screen tells you the position of a selected object's frame edges relative to the page.

graphics display in all their glory on-screen and print correctly if you use version 6.0 of the LaserWriter driver.

Color selection is on a frame-by-frame basis. You can't change the color of a few selected words in a text frame or a few pixels in a paint object or colorize part of an imported graphic — within a frame, it's all or nothing. But you can work around this limitation by using duplicate, overlapping frames, each with a different color assigned to it.

Monochrome screens can present problems when you're working with color. As a test, I placed solid yellow type on a solid red box. My monochrome screen showed me only a black box. Publish It! Easy can print spot-color separations (for commercial print jobs), but I ran into a problem doing so with the same test sample. You can't tell the program to cut out the yellow lettering shapes from the red copy. A commercial printer using these separations would end up printing yellow ink for the text on top of the box's red ink, so the text would end up either dark orange or invisible.

THE BOTTOM LINE Publish It! Easy's performance is a bit smoother and more stable than that of the earlier Publish It!. Its menus and dialog boxes are also noticeably less crowded, because some features and operational choices aren't included. But the program also adds some unique features that I hope will appear in future versions of its more feature laden cousin. Rotated text appears in position, and objects and frames rather than their outlines move with the cursor when you drag them for positioning. The instant interaction of the Library and the five levels of text undo are major improvements in DTP tools.

All in all, Publish It! Easy supplies more basic features than PageMaker 3.02 does (and even does a few things that PageMaker 4.0 can't do); runs much faster on any Mac (even a single 800K floppy-disk system); and may eliminate your need to purchase separate word-processing, drawing, and painting programs and (for PageMaker) an accelerator. Publish It! Easy is cheap, yet it delivers enough high-end features that it's an attractive value for anyone who occasionally needs to do page layout or anyone doing DTP on a budget.

If you consider functionality versus cost, it's hard to ignore Publish It! Easy, and compared to PageMaker 4.0, it's a steal. PageMaker 4.0 costs four times as much, but it still can't do some of the things Publish It! Easy can. Now, admittedly, PageMaker can do a lot of things that Publish It! Easy can't, but if you're in the market for a page-layout program, take a moment to assess your needs. You may find that this is one occasion when going with the market leader isn't in the best interest of either your documents or your wallet.

— **Darryl Lewis**

Get Info
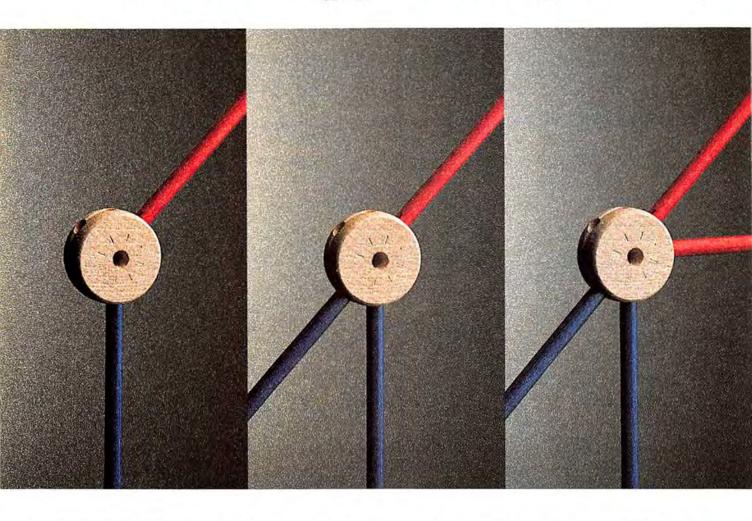
Publish It! Easy ♯♯♯♯
Published by: Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015-4914; (800) 535-9497 or (708) 948-9200.
Version: 1.10.
List Price: $199.

No other AppleTalk gateway

Choose an ordinary AppleTalk gateway and you better hope that your Macintosh network never grows or changes.

Choose ours and you'll welcome change. Because unlike other gateways, ours has the capacity to expand built right in.

For connecting AppleTalk networks with enterprise-wide Ethernet, the GatorBox® boasts a number of features that no other gateway has.
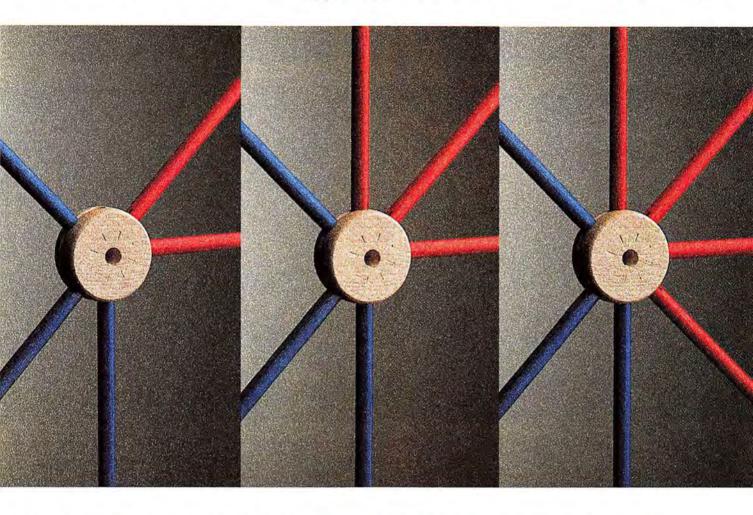
Tunneling, for one. Which lets you connect Macintosh networks over a wide area Ethernet backbone that doesn't use AppleTalk. No other gateway tunnels AppleTalk Phase 2 across a TCP/IP backbone.

Filtering, for another. Which gives you more control over what zones, devices and printers your Macintosh users see.

What's more, the GatorBox is the *only* gateway that runs optional software for Macintosh-Unix connectivity— GatorShare™ for file sharing and

makes adding options this easy.

GatorPrint™ for printing—without having to install additional (and expensive) software on all your computers. Nor is it necessary to reconfigure your Unix system with AppleTalk software.

Consider, too, that the GatorBox has more memory and a faster processor than any competing AppleTalk gateway.

And when it comes to support, Cayman is without equal. No one comes close to having our experience at connecting AppleTalk to open networks. No service team is more responsive.

And our hardware comes with a one-year warranty—overnight replacement guaranteed.

So, if you want to make sure that you have as many options as possible in the future, you really have only one option now.

Choose the GatorBox.

For more information about the GatorBox, call **617-494-1999** today. Or write, Cayman Systems, 26 Landsdowne Street, Cambridge, Massachusetts 02139.

CAYMAN
SYSTEMS

DATABASES

File Force

'4th Dimension, Jr.' may be the answer for users leery of 4D's complexity.

For several years ago, I enjoyed a sushi lunch with two software executives in California. The topic of discussion was 4th Dimension's power and how good its user environment was. We speculated that 4D could become a "File-Maker killer" if there were a way to provide just the user and design environments of 4D. The key reasons were 4D's true relational nature; its graphic-structure editor; and its programming language, which is more robust than File-Maker's simple macro facility. It would be silly to think our conversation was the inspiration for File Force, but in retrospect, that lunch does take on prophetic overtones.

File Force brings relational-database capabilities to users who might never have considered anything more than a relatively crude flat-file manager before. Less demanding than 4D, File Force can help you become comfortable with designing relational databases, in that it eliminates the potentially bewildering set of design choices that 4D sometimes requires you to make.

MORE THAN A KNOCKOFF File Force is more than a "lobotomized" 4D 2.0, however. ACIUS has paid careful attention to details that simplify life for casual users while offering a significant step up from flat-file managers such as FileMaker and Panorama.

File Force doesn't assume you're the most sophisticated power user on the planet, and its documentation (all six volumes of it) goes out of the way to explain things — such as the basic nature of relational databases — that were less clear in 4D's documentation. File Force is so thoroughly documented, in fact, that some users might be put off by the bulk of the documentation, but that would be a mistake. This is no large empty box filled with a chunk of foam and a skinny user manual. Beginning with the *Installation Utilities* manual, marked with a "Read Me First!" sticker, you are guided step by step through installing and using File Force. If you're a minimalist, you can get

away with reading the *QuickStart* and *Tutorial* manuals only, referring to the reference manuals as you need them.

ACIUS has broken new ground by providing a separate volume that documents numerous example databases. This approach is useful, as anyone who has ever received an example database from a vendor will know — typically you spend hours dissecting database examples, sometimes missing the point altogether. The example databases are thoughtfully designed and are of high quality. Each is designed to illustrate a few key ideas rather than show off a bewildering array of whistles and bells.
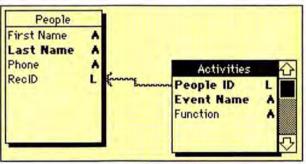
If you want meatier explanations of File Force features, you can turn to the *User Reference* and *Design Reference* manuals. Rounding out the documentation is the *Glossary and Master Index* volume, which lets you look up information in a single place rather than making you check the index of each volume

separately to find what you want.
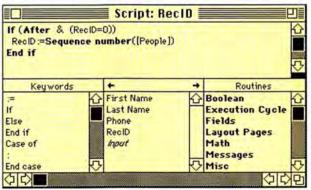
File Force has another hand-holding "feature" that will make many 4D users envious: several pages of on-disk artwork designed for use with the layout editor. These art offerings are similar to the Button Ideas and Stack Ideas stacks released with HyperCard.

File Force is first with a feature that is important to anyone who designs relational databases. You can specify how you want related records to be handled whenever a user deletes a record in a given file. In earlier databases, you had to include a fair amount of programming code to handle the "referential integrity" that is automatic in File Force.

POWERFULLY COMPACT File Force has fewer commands than does 4D, which is both a plus and a minus. Commands you would use to create the kind of fully customized applications that require 4D are missing, reducing the amount you need to know to get started with File Force. On the other hand, people who know 4D well are likely to find themselves looking for commands that aren't available.

In 4D, automatic file relations are optional, whereas File Force provides only automatic relations. This means novice File Force users don't have to make decisions about designing relational structures, but it removes opportunities for

File Force is a simplified version of 4th Dimension. Its structure editor provides a graphic way to view your database file structure, establish file relations, and gain access to layouts.

File Force scripts look like 4th Dimension scripts. The difference is that you don't need to write as many scripts as you might in 4D. This example assigns an automatic unique number to a new record once the record has been accepted.

tweaking relational performance, which are available in 4D.

You can run File Force in single-user or multiuser mode. Switching between modes is simple and involves holding down the mouse button when you start up File Force. In multiuser mode, File Force prevents any two users from changing the same record at the same instant but still lets the second user see the record. Because copies of File Force compare serial numbers when running on a network, it's important to keep track of which serial number is assigned to each machine on your network.

File Force does not offer the run-time environment familiar to 4D users. Its entire purpose is to let you create simple user-oriented applications, without the highly customized aspects of 4D. Many of my in-house 4D applications never get the run-time treatment but rely entirely on the user environment. File Force emphasizes this oft-overlooked feature.

Should you "run out of gas" with the capabilities that File Force offers, you can convert your File Force database directly into a 4D application without reconstructing the file structure or dealing with record import and export.

THE BOTTOM LINE Looking back on that sushi conversation, File Force is more than we envisioned — and less. It provides a more sophisticated environment than 4D 1.0's design and user environments and certainly provides more capability than a flat-file manager can. It also manages to do this with less complexity than 4D. On the other hand, by design, it lacks the one thing that has always enamored me of 4D: the sense of almost limitless possibilities. File Force may be all you'll ever want in a database manager, but many users will ultimately upgrade to 4D. Perhaps File Force's best feature is its direct upgrade path to 4D. By the time you outgrow its capabilities, you'll be ready to tackle 4D with confidence.
— **Louis E. Benjamin**

Get Info
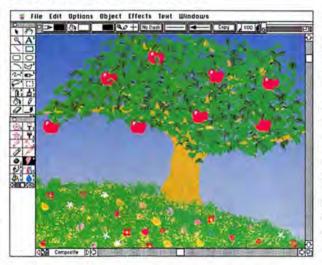
File Force ✦✦✦✦
Published by: ACIUS, 10351 Bubb Road, Cupertino, CA 95014; (408) 252-4444.
Version: 1.0.1.
List Price: $395.

UltraPaint

UltraPaint has an even more bewildering array of tools than True Value, but it still might be the 8-bit-color program for you.

UltraPaint takes the SuperPaint paradigm to extremes, creating an "all in one" graphics package with many specialty tools. In this painting, the gradient-blend bucket produced the background, the rubber-stamp tool created the flowers, and the three-color airbrush made the grass.

UltraPaint is a Swiss army knife of an 8-bit-color-graphics program. It's best suited for someone new to computer graphics and color, but experienced artists may also find it useful. At $199, it's a solid paint package with all the basic tools you'd expect, plus a variety of specialized tools and modes. Although the program and its interface are modeled on SuperPaint, it surpasses Silicon Beach's program in both power and functionality.

Historically Deneba's approach has been to include features that extend its programs beyond the applications' core. Canvas, for example, has basic painting tools along with its extensive drawing capabilities. UltraPaint takes this idea a step further. Although it overlaps some of Canvas' capabilities, it doesn't include Canvas' more advanced features, such as the Copy Manager, and Canvas doesn't have UltraPaint's power features, such as masking.

COVERING THE GLOBE UltraPaint is primarily an 8-bit-color paint program, but it also has object-oriented-drawing capabilities, tools for gray-scale-image editing, full support for Pluses and SEs, and an open architecture that lets Deneba or third-party developers easily add tools to
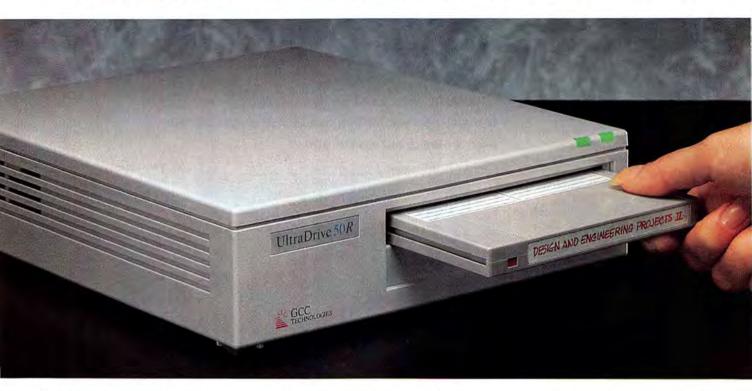
the basic program (although developers' tools are not included in the package).

UltraPaint combines paint and draw capabilities through a system of layers — paint being the main layer, with a draw and paint/draw composite layer on top of it. It also includes a variety of specialty tools that range from the rubber-stamp and cube tools, which make specific images such as leaves or a cube, to the gradient-blend bucket, a powerful tool that can make blended fills similar to the special fills that the higher-priced Pixel-Paint can make.

Another useful feature is the Color Manager, which lets users easily create an 8-bit-color palette of 254 colors plus the mandatory black and white. The default palette contains a variety of hues that should suit most users' initial needs. With a quick change to the Color Manager, you can convert all 254 colors to shades of gray. This feature, combined with its variable magic wand, smudge, charcoal, and water-droplet tools, makes UltraPaint a good system for editing gray-scale images.

BUGS IN THE TOOLBOX This is Ultra-Paint's first release, and it still has several nondestructive bugs, ranging from

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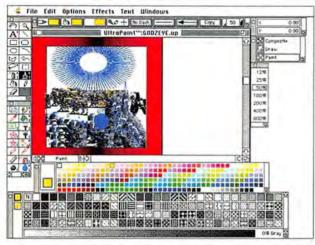
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This window shows the clutter that can result from UltraPaint's huge assortment of floating control windows.

the odd to the annoying. The odd bugs include problems with window drawing. Paint images can overlap onto the bottom of the screen and cover up the Image window's Layer Manager control. The control still works, but it looks like a continuation of the painting.

The most annoying bug involves the cursor. When you work in color, instead of being solid black, the cursor changes color as you move it across your painting (a memory-management technique that uses the Xon/Xoff Toolbox call), which can make it difficult to track. But worse yet, when you select a large part of an image, the cursor goes into a blinking mode — it appears for a second, disappears for three, appears, disappears, and so on. As a result, I kept losing the cursor and having to stop until it reappeared.

I also had a problem with the copy and paste functions. When I copied and pasted a black-and-white brick pattern, it ended up slightly wider than the original. (Deneba currently has work-around fixes for the window overlap and the copy problems and will have corrected them in the next update, possibly before you read this.)

Another problem I experienced had to do with UltraPaint's interface. It is similar to SuperPaint's system of floating tool windows, which makes it easy for SuperPaint users to move up to a more robust graphics package. UltraPaint takes SuperPaint's interface philosophy to an extreme, however.

UltraPaint is actually a core program with 27 external tools created at Deneba and an open architecture for third-party add-on tools. Unfortunately, Deneba decided to add most of these tools as individually selectable, on-screen tools

in floating control windows. The resulting interface is needlessly cluttered. For example, the default interface has 43 on-screen tools and controls residing in three floating windows. Of these tools, 6 are variations on the paintbrush, 4 are variations on a geometric-object tool, and 3 are variations on a selection tool, plus there's a pencil and a free-form tool that do essentially the same thing. And you can still add four more floating control windows to completely surround your drawing with controls. The interface may offer nearly unlimited power, but it comes at the expense of clarity.

THE BOTTOM LINE Overall, UltraPaint is a powerful, complete program, even if it tries too hard to show off its muscle. It's not a professional color-graphics program in the same league as Adobe's Photoshop or Letraset's ColorStudio or even Adobe's Illustrator 88. As an 8-bit-color program, though, it's a good value that can do the job if you're interested in exploring computer graphics or looking for an easy-to-learn environment that packs much of the power of those professional packages — provided you can put up with its quirky interface.

– Chris Stetson

Get Info

UltraPaint ‡‡‡½
Published by: Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122; (800) 622-6827 or (305) 594-6965 (in FL).
Version: 1.0.
List Price: $199.

Up to Date

Changes New and Noted

DOCUCOMP, Advanced Software's document-comparison program, has been upgraded to version 1.5. The new features include a find-text function that works in the same way as the Find command in most word processors; the ability to show changes in color in addition to underline, strike-through, and italic; new reading options that let users customize their comparisons to exclude hard page breaks, hidden text, automatic paragraph and footnote numbering, or any specific characters; the ability to read MORE II and 3.0 files; right-side or alternating-side revision bars; and a Go to Line Number option for fast scanning. Advanced Software, 1095 Duane Ave., Suite 100, Sunnyvale, CA 94086; (800) 346-5392 or (408) 733-0745. Version 1.5. $159.95; upgrades, $19.95 plus $3 shipping and handling or free if version 1.1 was purchased after April 1, 1990.

QMS COLORSCRIPT 100 MODEL 10, QMS' popular color thermal-transfer printer has been upgraded, without a price increase. The enhancements include double the standard memory (from 4 megabytes to 8 megabytes), an increased printable area (now 8.1 x 12 inches), an increased duty cycle, HP-GL emulation, and spooling. QMS, One Magnum Pass, P.O. Box 81250, Mobile, AL 36689-1250; (205) 633-4300. $9,995.

MACINUSE, the system-utilization utility, has been upgraded to version 3.0. You can now capture individual document names as well as applications; separate idle time from active computer use; track several applications simultaneously under Multi-Finder, with usage automatically recorded for all active applications; and design tables to include or exclude specific applications. Softview, 1721 Pacific Ave., Suite 100, Oxnard, CA 93033; (805) 385-5000. Version 3.0. $99; upgrades, $30.

DYNODEX, the "Filofax" on a Mac, is now a DA instead of an application. Version 1.2 boasts improved printing and dialing performance and a note field that can hold up to 5K of text. The suggested list price has also been reduced by $50. DynoDex 2.0 is scheduled for release by the end of this summer, and among its new features will be the ability to print labels, envelopes, letters, rotary cards, and any formatted text. Portfolio Systems, 158 Flushing Ave., Brooklyn, NY 11205; (718) 935-9501. Version 1.2. $99.95; upgrades, free to registered owners.

PAGE LAYOUT

Fast Forms and Informed Designer

Fast Forms covers the basics, but Informed Designer is the PageMaker of forms design.

PowerUp's Fast Forms and Shana Corp.'s Informed Designer are two highly innovative and effective forms-design programs. Each has carved out a particular niche in the Mac marketplace, even with competition from Claris' SmartForm Designer and Adobe's TrueForm, and both share interesting similarities as well as differences.

Fast Forms is a modest and inexpensive forms-design program aimed primarily at low-end users. Informed Designer is a complex and comprehensive forms-design program aimed primarily at the high-end corporate and professional arena. Indeed, it may be the first truly high-end forms program. The thing these programs have in common is that they were written by the same design team.

According to John Murphy, marketing executive for Shana, Fast Forms was written first and was sold to PowerUp to raise capital for Informed Designer's development. PowerUp has a reputation for providing good solid programming at fair prices, so the deal seemed a good idea and in fact proved beneficial to both companies. It made reviewing them a heck of a lot easier too, because once I'd gotten the feel of Fast Forms, learning to use Informed Designer was easy.

Now for some details.

FAST FORMS The first thing that impressed me about Fast Forms was its manual. It is truly a joy to read, which is something I don't often say about manuals. It is 105 pages long, with an addendum, and has an excellent five-step tutorial to start the learning process. After going through the tutorial — which took me only 90 minutes! — I had gleaned virtually everything I needed to know about the program. Best of all, in an apparent effort to buck current documentation trends, the manual doesn't have one of those annoying "if you're in a hurry, just read this" sections!

Fast Forms can import and export comma- and tab-delimited files and can deal with scanned images of pre-existing forms. The program lets you create fields, overlay them onto a scanned image, and

fill in information electronically if you wish. PowerUp also provides an extra application, Fast Forms Filler, that allows office personnel to fill out forms electronically without needing the original program or access to the original form design. Here is where one of the aforementioned "interesting differences" becomes apparent. Informed Designer does not come with a complementary stand-alone data-entry program as some forms programs do; it's available as a separate program (called Informed Mini Manager) that retails for $99 — but more on that later.

Fast Forms can deal with inches, points, and centimeters, but it cannot deal with the importation of EPS graphics. It converts any graphic into a bit-mapped image when it places it in a document. Its undo capability (something I've gotten used to, I'm afraid) is limited, and it has

Fast Forms is an excellent forms designer for users who need to knock off an occasional form. The tutorial is so concise that I was able to create this sample invoice in less than ten minutes. Note the similarity of tools and layout to Informed Designer's.

Informed Designer is the PageMaker of forms design: big, powerful, and ideal for large businesses or complex forms. It packs a lot of sophistication into a small set of palette tools. The program relies on an array of settings dialog boxes and therefore keeps tool clutter to a minimum.

Actual screen shown using ColorStudio® by Letraset.

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no Apply button to let you see changes before you OK them. The biggest drawback I found, however, was in dealing with both text and field objects.
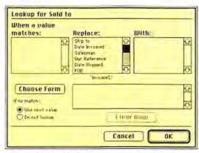
Like most forms programs, Fast Forms treats all on-screen items as "objects." You can pick fonts, sizes, and styles for text that appears in the original form design (text objects) and text that appears when you enter information into the form (field objects). Unfortunately, you cannot see the font, size, and style of the text in a field object until you've actually entered the information. Also, you make these style choices after you've entered the text into a particular object, which I find somewhat unnerving. You can create default settings, but only for the current session; there's no Preferences file mysteriously deposited into your System Folder.

These quibbles aside, I really liked Fast Forms — more than I thought I would. It has convenience features such as QuickTab: If you press Option-tab, you can skip entry fields on a form and go straight to the bottom. Calculated fields are easy to create. You don't have to be a rocket scientist or an Excel expert to come up with a field that can calculate the tax amount derived from a subtotal. If you have an ImageWriter, you will be happy to know that PowerUp took your needs into account; Fast Forms works just as well with an ImageWriter as it does with a LaserWriter.

INFORMED DESIGNER Fast Forms is excellent for dealing with fairly straightforward projects, but what if your tasks are demanding? For that matter, what if you are running a huge corporation that deals with thousands of forms every year? What if you need full-color, complex forms and you need to see crop and registration marks? For these kinds of problems and more, Informed Designer is the solution.

This programming marvel is capable of accuracy to 1/1,152 of a degree and lines from .25 to a whopping 999 points. It can import anything — text or graphics — as well as export to anything. It can take any object and rotate, replicate, duplicate, or resize it ad infinitum. It's that kind of program. There is an emphasis here on built-in intelligence, and such things as lookups; choice lists; and more than 150 mathematical, financial, statistical, and logical functions go a long way to prove it.

Then there's Informed Mini Manager

Informed Designer has some flat-file-database capabilities built in, such as the ability to look up information from one form and insert it into another. This concept eventually grew into Shana's latest add-on to the program, Informed Mini Manager.

(formerly known as Informed Manager). This extra program goes beyond electronic fill-in capability. In essence, it's a complete flat-file database that lets users merge or import data in a variety of ways. It's disk-based instead of RAM-based and provides an extra amount of security for those who accidentally quit or lose power before saving. It also adds database-like search and manipulation functions to the forms program, which can be a godsend if you have to deal with an overabundance of information.

Informed Designer lets you create and deal with multipart and multipage forms — up to 99 pages. (I hope I never have to fill out a 99-page form, but it's nice to know I can make one!)

The manual is less of a joy but is potentially more useful to novice Mac users. It's 460 pages long and contains no tutorial, which is a shame because this program needs one. On the other hand, it takes great care with all areas of discussion, including what I euphemistically call "Mac basics." Apparently Shana believes that nervous executives who have never touched a Mac before may try to use this program before learning how to use a computer properly. If this is the case, the execs have nothing to worry about — the manual explains literally everything about how to use the program. This is definitely a case in which an "if you already know how to use the Mac, just read this" kind of section would be useful and appreciated.

Informed Designer purports to open its own documents, "stationery," or Fast Forms documents. I found one fly in the ointment, however. When I tried to open a Fast Forms document in Informed

Designer, as described in the manual, nothing happened — just a blank document on-screen.

Stationery files are Informed Designer's way of creating defaults for fonts, styles, shapes, and other preferences. If you're familiar with MacWrite II's Stationery concept, you'll be familiar with Shana's. For example, a company can keep recurring elements, such as letterheads and other graphics, in a stationery document. You can also set a multitude of preferences, which stay from one session to the next. Measurement units include inches, picas, points, and centimeters, and you can change them at any time.

THE BOTTOM LINE If you're like me and just need to knock out a form or two and don't want to spend a lot, Fast Forms is for you. On the other hand, I was extremely impressed with Informed Designer's power and sophistication and just as impressed with the familiarity of the interface. Although its learning curve is steeper than that of Fast Forms, the rewards are greater. If you deal with large amounts of information, Informed Designer can meet all your needs. Shana is promising some truly innovative improvements to Informed Mini Manager in the near future, but for now it's offering Informed Designer and Informed Mini Manager together for only $149 retail if you send in a SmartForm Designer master disk. (Whoever said Mac-software retailing was subtle?)

— Ken Gruberman
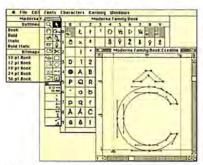
FontStudio

Letraset's latest addition to its Studio line breathes new life into type creation on the Mac.

For several years, the explosive growth of the Mac font industry has been fueled primarily by Adobe in the case of Type 1 format fonts and Altsys' Fontographer in the case of unencrypted Type 3 fonts. Now Letraset has directly challenged Altsys' preeminence in the field with FontStudio, the latest in its Studio line of graphics products. FontStudio cuts an impressive figure, unlike the other Studio programs, which have been somewhat tarnished by lackluster reviews, interface and documentation shortcomings, or other problems. In contrast to Fontographer, Letraset's offering provides a fully integrated environment for typography on the Mac.

FontStudio, Fontographer's first commercially available competitor, lets you create families of related font variations (for example, roman, italic, boldface). Here the outline-editor window shows a character from a newly forged font called Moderna Book. The main disappointment is that you cannot view the character set by keystrokes (as in the Altsys product) but must view it by character code.

JUST YOUR TYPE FontStudio's software-hardware configuration is modest: a Mac, 1 megabyte of RAM, and a 20-megabyte hard-disk drive. Letraset recommends an SE/30 or Mac II and 2 megabytes of RAM for optimal use.
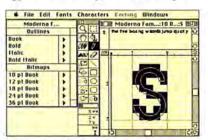
FontStudio's integrated approach to font creation becomes evident when you first launch the program. The first window you see is called a family window. The emphasis here is not on single fonts

but on typeface families — that is, all the style variations (boldface, italic, roman, and so on) that make up a typeface such as Times or Helvetica. The upper part of this window lists the names of all the outline fonts in the current typeface family. The lower portion displays the available sizes of bit-mapped screen fonts. If you're creating a family from scratch, you begin adding fonts to the family window with the New Outline Font or New Bitmap Font commands. A dialog box prompts you for a style name and other information. You can select any of the standard style variations (Plain, Bold, Italic, or Bold Italic) or create a style name of your own (for example, Oblique or Black).

In addition to creating new fonts, you can import Type 1 or Type 3 fonts that might already exist on your hard disk (similar to the composite fonts you can fashion in Fontographer). But the FontStudio versions are not mere "road maps" with references to the original fonts (which must remain installed in your printer for the composites to function properly) — they're fully editable character sets. This means you can, for example, create a dotless *j* from the *j* in an imported Adobe font for use with diacritical marks — something you can't do in Fontographer.

FONT FACTORY Whether you are starting from scratch or importing existing fonts, FontStudio provides sophisticated tools for drawing and editing outline characters. Unlike Fontographer, which provides separate tools for corner points, curved segments, and so on, FontStudio opts for an Illustrator-like use of the pen tool. You create curved segments by dragging out guide points each time you click and straight lines simply by clicking. You also have rectangle and ellipse tools and a very handy Make Parallel Paths command for creating duplicated character segments, such as letter stems. You can save character parts (for instance, the serifs of a particular face) in a library — a feature that helps guarantee consistency throughout all the characters

of a given font. A display window shows views of the current character in various point sizes.

FontStudio also provides the usual rotation, slant, flip, magnification (up to an 800:1 scale), auto-trace, and scissor tools. An unfamiliar addition is the hinting tool, which rather than being an asset, points out FontStudio's greatest flaw: The program does not automatically generate hints to improve printing of small point sizes on 300-dpi printers (Fontographer relies on the Nimbus Q technology for this ability) — font designers

FontStudio's seamlessly integrated bit-map editor, with features previously available only in stand-alone applications, makes editing an outline's corresponding screen font a snap. The editor also supports color and anti-aliasing.

must set the hints manually, one at a time.

Once you have created a family of related fonts with the outline editor, FontStudio can automatically generate the associated bit maps. You then polish up their appearance within the bit-map editor, which packs essentially the same wallop as Altsys' FONTastic Plus. The main difference here is that FontStudio's bit-map editor is built in and supports both color and anti-aliasing for superior screen display or specialized applications.

Both the outline and the bit-map editors provide user-specified levels of undo.

FontStudio also features a third window for creating, importing, or fine-tuning kerning pairs and character metrics that offers far more sophistication and power than the kerning support found in Fontographer. FontStudio's ability to import kerning pairs and AFM (Adobe Font Metrics) files from other fonts is in itself a welcome advance over the older program.

When you have given that last bit of spit and polish to all the fonts of your typeface family, FontStudio generates both the Type 3 printer fonts and the AFM files. And because you have created a family of related fonts (using the

NFNT standard), the four basic stylistic variations do not show up on application Font menus as separate entries. Only the main typeface family name appears, allowing you to use Command-B to use the true boldface version of your font (or Command-I for italics and so on). You can also export character sets in Illustrator 1.1 format, a capability also available in Altsys' Metamorphosis.

Unfortunately, FontStudio's documentation suffers from the all-too-familiar Letraset failings such as frequent typos, dropped-out paragraphs, inaccurate illustrations of dialog boxes, and — horrors! — you have to assemble the manual yourself.

THE BOTTOM LINE If you're in the market for a font-production system for the first time, FontStudio might well prove to be irresistibly attractive. Its ability to store character parts in a library, its excellent bit-map editor, and its strong kerning-pairs interface present compelling reasons to prefer it over Fontographer. Letraset has adopted a good clean, integrated approach to font creation that I find vastly superior to Altsys' modular strategy. Its most significant failing — lack of automatic hinting — is expected to be addressed in an update sometime in 1990. The ability to save fonts in a Type 1 ATM-compatible format is also planned for a future release this year. No firm schedule for either of these additions has been fixed, though.

Perhaps the most persuasive reason for favoring Letraset over Altsys is financial. You'd have to purchase four separate Altsys programs — Fontographer 3.0, FONTastic Plus, Family Builder, and Metamorphosis, at a total list price of almost $1,000 — to rival the power (but not the convenience) of FontStudio, which lists for about $600.

With FontStudio, Letraset finally has a clear winner in its Studio line of graphic products.
— **Gregory Wasson**

Get Info

FontStudio ♯♯♯♯½
Published by: Letraset, 40 Eisenhower Drive, Paramus, NJ 07653; (201) 845-6100.
Version: 1.0.
List Price: $595.

Metamorphosis

Metamorphosis gives type designers and artists access to Adobe Type 1 outlines — but at a price.

▶ **M** Like the Martians gazing greedily 1.0 on the watery fertility of Earth in *The War of the Worlds,* type designers and graphic artists have long coveted Adobe font outlines. Adobe's release of Type 1 specifications opened the door, and Altsys, creator of a variety of typographical programs for the Mac, marched through that door with Metamorphosis, a $295 font utility.

ABOUT-FACE Metamorphosis is a simple program — in both interface and function. It does only one thing: convert the characters of any Type 1 (this includes all Adobe typefaces) or Type 3 font into editable PostScript outlines. You can save converted fonts in three formats: as a Fontographer database, as a Fontographer Type 3 printer font, and as EPS outlines that you can manipulate in Adobe Illustrator or FreeHand.

The program can run on a Mac Plus with only one disk drive, but Altsys recommends that you use a 68030 machine and a hard-disk drive. You must also have a PostScript printer connected to your Mac.
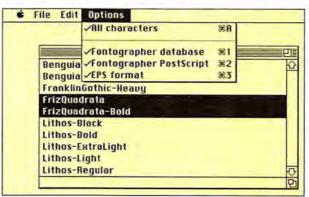
FACE-TO-FACE The interface is like that of FontLiner, a very limited first-generation font-converter program (see the review, July '89, page 185), and it should prove easy to master — even for the dullest of dullards. When you launch Metamorphosis, an empty window called the Font List appears. You add fonts you want to convert to the window with the

Open Font file or Open Installed Fonts command on the File menu.

Once you've put together a font list, you can set various options before you actually start the conversion. The All Characters option lets you specify whether all 256 characters in a given font, including some esoteric diacritical marks and symbols, should be converted. If the option isn't selected, Metamorphosis will convert only the font's 128 main alphanumeric characters.

You can then specify that the program convert the fonts into one, two, or all three of the supported formats. The Fontographer Database option creates a Fontographer source file, where you can customize the font within Fontographer and then generate Type 3 printer fonts. Although Fontographer already lets you create composite fonts that reference Adobe fonts, creating the Type 3 source file in Metamorphosis first has its advantages. The source file lets you edit the actual outlines before you create printer fonts – you can't ordinarily do this when you create composite fonts. A practical example: Some European languages need to accent the letter *j* with a circumflex or grave accent. In a composite font, you can paste the accent over the *j* but the dot remains. But you can delete the dot if you work with a Type 3 source file. The result is a dotless *j* and a cleaner, more professional look.

The Fontographer PostScript option

Metamorphosis is a rather pricey font utility for converting Adobe Type 1 fonts or any Type 3 fonts into editable PostScript outlines. One window lists the fonts you want to convert, and three menus let you select fonts and make settings.


```
 🍎  File  Edit  Options
                    ✓All characters          ⌘A

                    ✓Fontographer database   ⌘1
         Benguia   ✓Fontographer PostScript ⌘2
         Benguia   ✓EPS format              ⌘3
         FranklinGothic-Heavy
         FrizQuadrata
         FrizQuadrata-Bold
         Lithos-Black
         Lithos-Bold
         Lithos-ExtraLight
         Lithos-Light
         Lithos-Regular
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★Abacus Concepts ... 30 day MBG		
4482	StatView SE + Graphics 1.03	179.
4481	StatView II 1.03.	279.
5840	SuperANOVA 1.1 *(for Mac Plus/SE)*	309.
5904	SuperANOVA 1.1 *(for Mac II)*	309.
5907	StatView II/SuperANOVA Bundle. .	569.
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5618	4th Dimension 2.0.10	465.
4024	4th Dimension Runtime *(4 user)* . .	249.
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7446	MacLabel Pro 1.0	49.
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5492	Omnis 5 1.1	call
★Bravo Technologies ... 30 day MBG		
1539	MacCalc 1.2D	79.
★Chang Labs ... 30 day MBG		
1611	C.A.T. 3.0	289.
★Checkfree Corp. ... 30 day MBG		
6928	Checkfree Mac 1.5	20.
★CheckMark Software ... 60 day MBG		
5861	CashLedger 1.3A	115.
5862	Payroll 4.1.	175.
5863	MultiLedger 1.3	235.
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1129	MacWrite II 1.1	145.
4196	FileMaker II 1.1V2	218.
1125	MacProject II 2.1.	365.
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★Deneba Software ... 30 day MBG		
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1768	Coach Professional 3.1.	124.

A Lasting Impression
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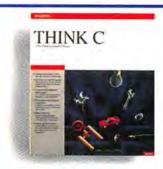
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7485	Desktop Help for Excel	52.
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4955	Wingz 1.1A.	245.
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2425	Quicken 1.5	35.
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6984	Correct Grammar 1.0	49.
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4602	EndNote 1.2.1	74.
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★Odesta ... 30 day MBG		
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6916	Dynodex 1.1.	57.
7448	Paper for Dynodex	14.

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Miles Computing		
5253	The Puzzle Gallery	26.
2765	Fool's Errand	32.
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3987	Colony *(CP)*	29.

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	MacConnection carries the entire line of PTS modules for Excel 2.2, Word 4.0, HyperCard, Persuasion 2.0, PageMaker 4.0, Illustrator 88, FileMaker II, FreeHand 2.02, and the Macintosh .... each	52.
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5774	NetTrek—The Real Version 2.3	34.
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7366	Thexder	21.
3397	Leisure Suit Larry *(CP)*	23.
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3502	Beyond Dark Castle	32.
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★Softstream Int'l., Inc. ... 30 day MBG		
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4073	Colour Billiards	38.
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1842	Chessmaster 2100 1.1	32.
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4588	Life & Death *(CP)*	32.
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★XOR ... 30 day MBG		
6152	TaskMaker *(CP)*	27.
6040	MacGolf Classic *(CP)*	52.

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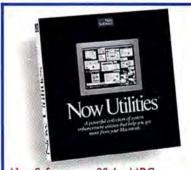
★Abaton ... 30 day MBG		
6266	InterFAX 24/96 Modem	419.
★CE Software ... 60 day MBG		
5638	In/Out *(10 user)*	187.
5174	QuickMail 2.2 *(5 user)*	215.
5173	QuickMail 2.2 *(10 user)*	315.

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7085 *FileGuard Extended 2.5*–Protect your hard drives, applications, files/folders (including system folder) from unauthorized access, deletion, and/or illegal copying. Now with system usage audit trail. 5 & 10 user also available.... **$145.**

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1673	CompuServe Navigator 3.0	49.
1674	Standard Service/Navigator Bundle	69.
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5834	Connect 1.5 for the Macintosh	63.
★DataViz ... 60 day MBG		
1823	MacLink Plus/PC 4.5	119.
4842	MacLink Plus/Translators 4.5	99.
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6758	DoveFax Desktop	279.
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★Dow Jones ... 30 day MBG		
5295	News/Retrieval Membership Package	24.
1785	Desktop Express 1.03	95.
★Farallon Computing ... 30 day MBG		
5707	Timbuktu 3.1	95.
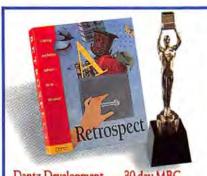
Now Software ... 30 day MBG
6925 *Now Utilities 1.0*–A collection of 12 system enhancement utilities. Flash appointment reminders, display pictures on your Mac, pop-up the menu bar anywhere, make Font menus WYSIWYG, and much more!........ **$89.**

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6371	Timbuktu/Remote Access Pack ..	845.
4867	Timbuktu 30-Pack 3.1	1285.
2202	PhoneNET to LocalTalk Adapter	8.
5664	PhoneNET StarConnector	17.
6273	PhoneNET StarConnector 10-Pack .	129.
2203	PhoneNET Connector *(DIN-8)*	31.
4869	PhoneNET Connector 10-Pk *(DIN-8)*	198.
5251	PhoneNET CheckNET	64.
2206	PhoneNET StarController 300	825.
6687	PhoneNET StarController-EN	1599.
5893	Portable Pack	329.
6778	Remote/Wakeup Cable	33.
6766	MediaTracks	189.
6767	MediaTracks Multimedia CD Pack .	319.
6768	MediaTracks Multimedia Pack	319.

★Freesoft ... 60 day MBG

6115	White Knight 11.6	85.

Hayes

2300	Smartcom II 3.1C	84.
2307	Smartmodem 2400	349.
6655	V2400 Baud Modem	469.
5991	V9600 Baud Modem	759.

Insignia Solutions

7058	SoftPC-AT/EGA Module	125.
4089	SoftPC 1.3	245.
6688	SoftPC for the Mac Portable	245.

Intel Corporation

5119	2400EX Modem	179.
6265	2400EX with QuickLink II	195.
6420	2400EX MNP Modem	229.
6650	2400EX MNP with QuickLink II ...	249.

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5858	Microsoft Mail 2.0 Workstation	83.
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6751	TurboNet ST *(12-Pack)*	279.
5277	TurboBridge	319.
6272	NuvoLink SC	309.
6750	NuvoLink II	275.
6261	TurboStar	1095.

Orchid Technology

6949	OrchidFAX Modem	459.

★Practical Peripherals ... 30 day MBG

3102	2400 Baud External Modem	179.
5285	PM 2400SA MNP Modem	209.
3089	Mac Communications Pack 1.5 ..	225.

★Shiva ... 30 day MBG

3444	NetSerial X232	$275.
4347	NetBridge	339.
4942	TeleBridge	339.
3443	NetModem V2400	429.
6917	NetModem V.32	1429.
6519	EtherGate	1629.

★Software Ventures ... 30 day MBG

3455	MicroPhone II 3.0	215.

★Solutions, Inc. ... 60 day MBG

6721	MailMaker 5 User Pack 1.1	117.
4308	BackFAX *(reqs. Apple FAX modem)*.	139.
6720	FAXGATE Plus 1.1	239.

★Synergy ... 30 day MBG

6618	VersaTerm 4.1.1	88.
6619	VersaTerm-PRO 3.1.1	174.

★TOPS ... 30 day MBG

4188	TOPS Teleconnector *(DIN8)*	23.
4598	TOPS FlashBox	118.
3723	TOPS Mac 2.1 *(limited supply)*	137.
3720	TOPS Flashcard	155.
7057	MacPrint TOPS Network Version 1.0	165.
6264	TOPS Networking Bundle 3.0	187.

★Traveling Software ... 60 day MBG

3729	LapLink Mac III Connectivity Pac..	119.
6741	LapLink Mac III Network Pac.....	185.

Berkeley Systems ... 30 day MBG
5737 *After Dark 2.0*–New! Over 30 displays &
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worms. Use company logo, messages. Great
Fish, Flying Toasters, & MultiModule. Random
display, & password sleep .... **$22.**

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7432	300/GS Flatbed Scanner	1099.
7433	Scanner Kit w/Digital Darkroom ..	259.
7431	Scanner Kit w/ImageStudio	259.

★American Power ... 30 day MBG

5895	UPS 110SE	209.
6686	UPS 370ci	295.

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6717	MIDI Interface	84.
6714	Apple Hi Res Color 13" Monitor ..	849.

Brother International

6934	HL-8PS Laser Printer	3299.

Caere

4476	OmniPage 2.1	539.
	OmniSpell or OmniDraft ... *each*	69.
	OmniTrace or OmniProof ... *each*	105.

★CH Products ... 30 day MBG

7343	Mach IV Plus Joystick *(Quad or ADB)*	51.
7344	Rollermouse *(ADB)*	79.

ICOM Simulations
4084 *On Cue 1.3*–Easy-to-use utility which
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ments, directly onto your menu bar so you
can move swiftly and easily from application
to application. A lifesaver w/MultiFinder **$35.**

★CoStar ... 30 day MBG

6090	LabelWriter	185.
6067	LabelWriter Labels	11.
7452	LabelWriter Labels *(12-Pack)*	63.

★Datadesk ... 30 day MBG

1818	HyperDialer	32.
6901	Switchboard *(modular keyboard)* .	175.
6815	Function Key Module	39.
6813	Modular Trackball	119.
	MAC-101 Keyboards ..... *each*	129.

★Forte Communications ... 30 day MBG

7317	Remote Keyboard/Mouse	289.

★GDT Softworks ... 30 day MBG

6256	PrintLink Collection 3.01	59.
6151	JetLink Express 1.2	89.
6257	JetLink/Expressive Fonts Bundle..	159.

Hewlett Packard

6514	HP DeskWriter Printer	859.
6689	HP DeskWriter & ATM Bundle....	889.

★Kensington ... 30 day MBG

	Turbo Mouse 3.0 *(Plus or ADB)* ea.	109.

Koala

2593	MacVision 3.0	259.

Kodak

6730	DICONIX M150 Plus Printer	489.

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3455 *MicroPhone II 3.0*–New version of top-
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Supports XCMDs & XFCNs, ZMODEM,
icons, European languages, color & sound **$215.**

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2792	3½" DS/DD Disks *(10)*	14.
2793	3½" HD Disks 1.44 Meg *(10)*	27.

★3M ... 60 day MBG
3943	DC2000 40 MB Data Cartridge....	20.

★MacConnection ... 60 day MBG
6592	44 Meg. Removable Cartridge	85.

ACCESSORIES

Apple Computer
1114	LaserWriter Plus Toner Cartridge...	99.
1115	LaserWriter II Toner Cartridge	105.

★Avery ... 60 day MBG
4864	Disk Labels 3½" *(Qty. 250)*	13.
5392	Disk Labels 3½"-*Laser (Qty. 630)* ..	29.
4865	Address Labels 3½" x ¹⁵/₁₆" *(3750)*	15.
4811	Transparencies 8½" x 11" *(Qty. 50)*	22.
4807	Laser Labels 1" x 2⅝" *(Qty. 3000)*..	24.

★Basic Needs ... 60 day MBG
	Dust Covers	call
	Hard Top Keyboards .... *each*	15.
6682	Hard Top ImageWriter II	16.
7413	Mac IIcx/ci Monitor Stand	47.
7417	MacMouse *(cordless mouse)*	89.

Farallon Computing ... 30 day MBG
5707 *Timbuktu 3.1*–Features a multiple window capability which allows a Mac to view and control other Macs on a network simultaneously. A great brainstorming tool. Ideal for business and teaching environments ... **$95.**
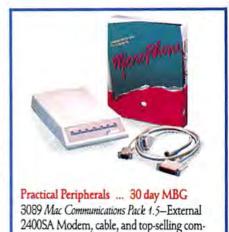
★Computer Coverup ... 60 day MBG
1723	ImageWriter II Cover............	$8.
1725	Mac SE Ext. Keyboard Cover set...	10.

★CoStar ... 30 day MBG
7453	The Organizer Jr.	69.
6091	The Organizer.................	199.

Curtis Manufacturing
6733	GFP-3 *(Glass Filter Plus-Mac Plus, SE)*	65.

★Goldstein & Blair ... 30 day MBG
2267	The Macintosh Bible *(3rd Edition)* ..	19.

★I/O Design ... 30 day MBG
2379	MacLuggage Imageware II	49.
2376	MacLuggage Macinware Plus	59.
2381	MacLuggage Macinware SE......	75.
6129	The Ultimate SE/Ext. Carrying Case	79.
	Neon Ultimate SE/Ext. *(available in pink, green, or yellow)* ...... *each*	89.

★Kensington ... 30 day MBG
4643	Mac II Stand and Cable Kit	64.
2573	Tilt/Swivel *(platinum)*	22.
4973	Power Tree 20	27.
2559	Apple Security Kit	33.
2566	System Saver Mac *(platinum)*	63.
2567	System Saver Mac *(beige)*	63.

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Nutmeg 19–Monochrome two-page display for your Mac SE, SE/30, or II. ACrisp 72 dpi and 78 hz refresh rate make it ideal for DTP. Features platinum case and anti-glare screen coating.................... **$995.**

2546	A-B Box *(DIN-8)*	63.
6763	SE Radiation/Anti-Glare Filter	52.
5064	Apple Color Monitor Polarizing Filter	63.
	PowerBackers	call

★MacConnection ... 60 day MBG
4623	Solid Oak Disk Case *(holds 90 disks)*	32.

★Mobius Technologies ... 60 day MBG
4470	Fanny Mac QT	55.

★Moustrak ... 60 day MBG
2694	Moustrak Pad *(standard 7" x 9")* ...	8.
2692	Moustrak Pad *(large 9" x 11")*......	9.

Ribbons
3255	ImageWriter II Ribbon Black	4.
3261	ImageWriter II Ribbon Multi-4-Color .	9.
3270	ImageWriter II Rainbow 6-Pack....	20.
3260	ImageWriter LQ Black Ribbon....	17.

★Sopris Softworks ... 60 day MBG
4019	Mac SE & Ext. Keyboard Cover *(navy)*	15.
4017	ImageWriter II Cover *(navy)*	11.
4018	LaserWriter II Series Cover *(navy)* ..	17.
4012	High Trek ImageWriter Carry Case ..	49.
4013	High Trek Mac Plus Carry Case	59.
4014	High Trek Mac SE & Ext. Kybd. Case	69.
4862	SE Protection Pak *(ext. keyboard)* ..	75.

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3089 *Mac Communications Pack 1.5*–External 2400SA Modem, cable, and top-selling communications software. Hayes compatible, auto-answer..................... **$225.**

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3618	ImageWriter II Carry Case........	45.
3617	Mac Plus/SE Carry Case..........	55.
4015	Mac SE & Ext. Kybd. Carry Case ..	69.

★Tripp Lite ... 30 day MBG
6200	Isobar 6 *(surge suppressor, 6 outlets)*.	59.

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peanuts or plastic.

Metamorphosis saves converted fonts in several formats. The most exciting one for graphic artists is EPS Adobe Illustrator 1.1. Each character is saved as an editable PostScript-graphic outline.

creates Type 3 printer fonts. The manual says this lets you use Adobe fonts with programs such as QuarkXPress, but now that ATM is out, allowing you to make smooth large-sized screen fonts, this option seems irrelevant.

The EPS Format option saves the characters of a converted font as editable graphic outlines in an Adobe Illustrator 1.1 file.

Once you've made all your decisions, you must fire up your PostScript printer and select Generate from the File menu. And then you wait. Metamorphosis converts the listed fonts into the formats you've specified and downloads the fonts to the printer, where the actual outline capture takes place. The new files are all placed automatically in a common folder. You can put the process in the background under MultiFinder, as each font can take several minutes.

Metamorphosis displays some minor divergences from the usual Mac interface. Both the Open Font file and Open Installed Fonts commands should include an ellipsis, as they lead to dialog boxes.

Get Info

Metamorphosis ♯♯♯♯
Published by: Altsys, P.O. Box 865410, Plano, TX 75086; (214) 424-4888.
Version: 1.0.
List Price: $295.

And you cannot add a font to the font list by double-clicking on a name in the Select Font dialog box.

THE BOTTOM LINE Metamorphosis is a handy tool, both for type designers who need to work with Adobe outlines and for artists who want to treat type as graphics. But it should have been incorporated into Fontographer rather than marketed as a rather pricey stand-alone package. If you haven't already invested in Altsys' product line, I recommend that you take a look at Letraset's FontStudio instead. That fine product is the equivalent of Altsys' Font-ographer, Family Builder, and Metamorphosis — all rolled into one. And you'll save yourself some money: It costs $595, versus $890 for the Altsys triumvirate. Also, ImageClub is about to introduce Evolution, a type utility that will do

everything Metamorphosis does plus convert Type 3 into Type 1 fonts that will work with ATM. Slated for release at the end of May, it will cost only $99. Evolution has been delayed several times, which may indicate some problems, but look for the product anyway. Its release will undoubtedly force Altsys to rethink its pricing and add to Metamorphosis' functionality.

— Gregory Wasson

[As this issue went to press, Altsys announced Metamorphosis version 1.5, which reads Type 1 fonts, as well as Type 3 fonts created with Fontographer, directly from disk. More importantly, version 1.5 can convert Type 3 fonts into the ATM-compatible Type 1 format. The beta version of 1.5 that was tested performed flawlessly. — GW]

UTILITIES

Maxima and NanoDISK

If you're going to spend the cash on 4-megabyte SIMMs, you need tools such as these to take advantage of all that RAM.

RAM is like soda pop: No matter how much you have, you always consume it — at least up to a point. With the SE/30 and Mac II line, that point is 8 megabytes. Even though these machines' eight SIMM sockets can accommodate up to 32 megabytes, current system software utilizes only the first 8 megabytes for applications and their documents.

Maxima and NanoDISK are utilities that let you break that 8-megabyte limit. Each lets you use memory in excess of 8 megabytes as a RAM disk, but Maxima also tricks system software into letting applications access extended memory. For example, in a 16-megabyte configuration (with 4-megabyte SIMMs, your only possible configurations are 16, 17, 20, or 32 megabytes), the first 8 megabytes are reserved for system RAM; Maxima lets you divide the remaining 8 megabytes into a RAM disk, additional system RAM (up to a total of 14 megabytes), or both.

RAM DISKS RAM disks are volumes that behave like hard disks, except that access is much faster (up to four times

faster than a 19-millisecond Quantum ProDrive 80), because data is stored in the computer's memory rather than on magnetic media. With some caveats, RAM disks can be treated as wicked-fast hard disks.

Setup of the RAM disks differs with each utility. NanoDISK is a RAM disk only, available only in a bundle with Technology Works' 16-megabyte memory-upgrade kit. You launch the NanoDISK application to install the appropriate drivers and create a RAM disk that uses all memory in excess of 8 megabytes. You then return to the Finder and drag the desired files from your hard disk to the RAM disk. (If you've designated NanoDISK as a startup application in the Special menu, the RAM disk and its contents are installed at each startup.)

At shutdown, depending on your preference settings, a mirror image of the entire RAM disk is written to a "backing store file" on your hard disk. Unfortunately, the backing store file, whether it's full or empty, is as large as the RAM disk. Also, if your hard disk doesn't have enough free space to accommodate the

Maxima is a utility for addressing extended memory beyond the 8-megabyte limit. It can create a RAM disk and let applications use the memory beyond 8 megabytes. It's an excellent tool to have if you're going to spend $2,000 on 4-megabyte SIMMs.

backing store file, you may lose some of the silicon files.

In contrast, the Maxima RAM disk is created at startup by a combination startup document and cdev. If you wish, files from a specified folder are automatically copied to the RAM disk. And at shutdown, any changes stored on the RAM disk replace the files in the original folder. The benefit of this method is that the hard disk doesn't contain duplicate files; the originals act as your backing store file, so to speak. Also, you can make the RAM disk the startup volume by copying the contents of the hard disk's System Folder to the RAM disk at startup.

Maxima and NanoDISK's RAM disks are equally fast, taking roughly one minute to launch and load themselves with 6 megabytes of files. But thanks to its write-through option, NanoDISK has a leg up

Get Info

Maxima ♦♦♦♦½
Published by: Connectix, 125 Constitution Drive, Menlo Park, CA 94025; (415) 324-0727.
Version: 1.0.5.
List Price: $129.

NanoDISK ♦♦♦
Published by: Technology Works, 4030 Braker Lane W., Suite 350, Austin, TX 78759; (800) 688-7466 or (512) 794-8533.
Version: 1.1.
List Price: $1,995, bundled with 16-megabyte upgrade.

on Maxima when it comes to protecting files from restarts, system errors, RAM-disk trashing, or presses of the programmer's switch. The write-through option automatically saves any RAM-disk changes to the backing store file on the hard disk. Although you can rest assured that your files are safe, performance is little better than it is when you use a hard disk alone. Instead of leaving the write-through option on all the time, you can invoke it by command or at shutdown.

Maxima does not have a write-through option; it saves RAM-disk changes to the hard disk at shutdown or whenever you restart while holding down the Tab key.

EXTENDED MEMORY RAM disks are great if you work with disk-intensive applications all day long, but anyone who has confronted the "Insufficient memory to open this application" alert box will love Maxima's extended-memory feature. Maxima lets applications use a maximum of 15 megabytes of RAM minus 1 megabyte for each NuBus card installed.

With a few exceptions, under the Finder, a single application can use up to 14 megabytes of memory. The largest block of memory available to a single application under MultiFinder remains 8 megabytes. Even so, extended memory

and MultiFinder are a match made in heaven. You can open application after application with little fear of running out of memory.

THE BOTTOM LINE Currently 4-megabyte SIMMs are so expensive (approximately $500 each versus about $65 for 1-megabyte SIMMs) that there is no reason to buy them unless you're going to use every byte possible. Maxima lets your applications run free in up to 14 megabytes of memory and can allocate any remaining memory to a lightning-fast RAM disk. Its elegant design is flawless. Maxima would be complete if only its RAM disk had automatic write-through and volume-size partitioning features.

NanoDISK provides a functional RAM disk with powerful write-through protection, but there is much room for improvement. Because it is implemented as an application, reconfiguring the RAM disk is a clumsy affair. More damning is that the backing store file on the hard disk is superfluous and always as large as the RAM disk, not its contents. As a stand-alone product, NanoDISK can't cut the mustard, but it makes a decent freebie bundled with the 16-megabyte upgrade from Technology Works.

— Owen W. Linzmayer

THINK Pascal

Symantec's new Pascal gives people who think C is *the* hip language cause for pause.

THINK Pascal 3.0 is at the cutting edge of software development on the Mac. It has full support for object-oriented programming (OOP), and it provides an exemplary development environment that includes integrated source-level debugging and extraordinarily fast compile-and-link times.

OOP, OOP, AND AWAY The previous version of THINK Pascal, 2.0, already supports Apple's Object Pascal language; version 3.0 adds the necessary features for compiling Apple's MacApp 2.0 object-oriented application framework. MacApp is a full-featured class library written in Object Pascal; unfortunately, it also contains MPW (Macintosh Programmer's Workshop) Pascal-specific directives. The MPW development system

isn't known for great compile-and-link speed; THINK Pascal is. Because of THINK Pascal 3.0, MacApp is now accessible to a much broader audience.

If MacApp is too comprehensive for you, Symantec provides the THINK Class Library (TCL) in source form with Pascal 3.0. The TCL fills the need for a smaller but still complete class library. Because the TCL comes with 3.0 for free, you can decide whether it suffices before you spend money on MacApp. Whether you buy MacApp or not, however, you will need RAM. THINK's TCL requires 2 megabytes of RAM, and you need 4 megabytes for MacApp.

Supporting an OOP language and having a broad range of existing classes to build on is not enough, however. The

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development environment you use greatly influences your productivity. THINK Pascal 3.0 comes with a Class Browser to let you maneuver within your OOP program with ease. The Browser provides a view of your program that shows its object hierarchies rather than the way it is split up among its files. The Browser is an excellent learning tool for TCL or MacApp, because it depicts the structure, relationships, and characteristics of different objects.

FAST AND FURIOUS Speed and efficiency are fundamental attributes of development tools. THINK Pascal has an intelligent editor that preprocesses source code, as well as a fast compiler and an intelligent and speedy linker. Pascal 3.0's linker is granular at the procedural level: Only those procedures and functions that are actually used within your program are included, making your application as small as possible.

THINK Pascal 3.0 also supports MPW's $S directive, which is used for specifying how an application's code is segmented. This directive was implemented because it is used heavily in MacApp; it's also useful for designing memory-efficient applications. Even with all the added functionality, Pascal 3.0's linker is still as fast as expected; additional intelligence has not hurt performance at all.

MANEUVERABILITY THINK Pascal's user interface is designed to facilitate fast source-code maneuvering. The Class Browser is an integral part of this, but you can also traverse non-object-oriented programs quickly, with the help of pop-up menus that let you jump directly to files and the procedures within them. Window placement and size are remembered as well, so you can set Pascal 3.0 to automatically open windows that were open when you quit, putting you right back where you were during the previous session. LightsBug, THINK Pascal's source-level debugger, is also integrated completely into the environment, and it fully supports the debugging of object-oriented programs.

THINK Pascal 3.0 also includes numerous touches that make the product as a whole a pleasure to use. The smart editor still formats your source code for you, so you don't have to worry about indenting lines.

The Project Utilities application lets you back up source files and print them or print a list of all the files contained in a project. You no longer have to open each file in the Pascal environment to print it, and backing up only those files that have changed is a snap.

Finally, the Pascal Source Converter application that is part of THINK Pascal 3.0 makes the transition from MPW Pascal to THINK Pascal as simple as possible. The converter is used to preprocess MacApp for use with THINK Pascal 3.0, but it is also useful for processing any MPW Pascal source file.

THE BOTTOM LINE THINK Pascal 3.0 provides an excellent development

environment. Fast turnaround times, a complete set of high-quality tools, such as a smart editor, a compiler that produces tight and fast code, and an intelligent linker — not to mention a fully integrated editing and debugging environment and the option of using MacApp or the THINK Class Library for OOP development — make this the development system to use if you program in Pascal on the Mac.

— **Stephan Somogyi**

PROGRAMMING TOOLS

AppMaker
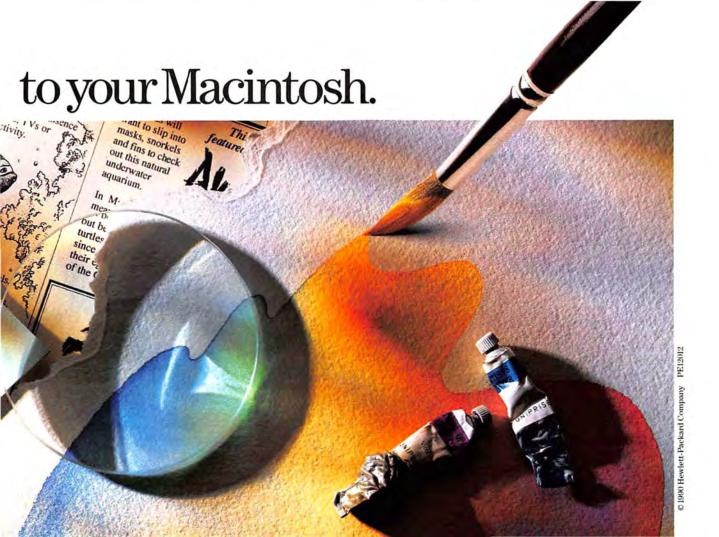
Building Mac interfaces doesn't have to be an onerous task anymore.

If you write Mac applications, you spend a great deal of time writing user-interface code. The NeXT Interface Builder is an excellent example of a tool for developing a user interface graphically, but no Mac tools offer comparable functionality. AppMaker comes very close, though.

AppMaker 1.1 lets you design menus, windows, and dialog boxes by using drawlike tools. It then generates the necessary resources and source code for the user interface. All you need to add is the functional non-user-interface part. Source-code generation based on drawn

prototypes is nothing new. What's special about AppMaker is that it generates code for THINK's Class Library, either the Object C or the Object Pascal version. Also, once AppMaker has generated the code, it still lets you go back and edit what you were working on previously. This is made even easier because of object-oriented programming's encapsulation feature, in which objects are self-contained but extensible without having to edit an object's original source file: the source generated by AppMaker never needs to be edited.

Although AppMaker has quite a way

to your Macintosh.

to go compared with NeXT's Interface Builder, it's the first Mac tool that permits graphical design of standard Mac user-interface elements based on an object-oriented framework. AppMaker alleviates much of the tedious programming required when using standard Mac user-interface elements in your software, letting you develop basic, Macintosh-like applications much faster. If you want to generate appplications quickly, AppMaker is a real help.
— **Stephan Somogyi**

Get Info

AppMaker ♪♪♪½
Published by: Bowers Development, P.O. Box 9, Lincoln Center, MA 01773; (508) 369-8175.
Version: 1.1.
List Price: $295.

Photographs and Clip Art on CD-ROM

Clip-art collections are getting bigger and bigger, but you may not always get what you pay for.

CD-ROM is being touted almost exclusively as a tool, perhaps *the* tool, for multimedia and hypertext applications. But for many people, especially desktop publishers, the medium's real value is as a way to distribute and store large clip-art collections that would ordinarily consume huge chunks of hard-disk space. CD-ROM's immense capacity becomes particularly meaningful and welcome when you confront the enormous size of scanned color TIFF images.

NEC was one of the first companies to market collections of stock photos on CD-ROM, but the usefulness of its products has been constrained by the strict limitations the company places on users: The TIFF images can essentially be used only for in-house publications. Several other companies have followed suit with
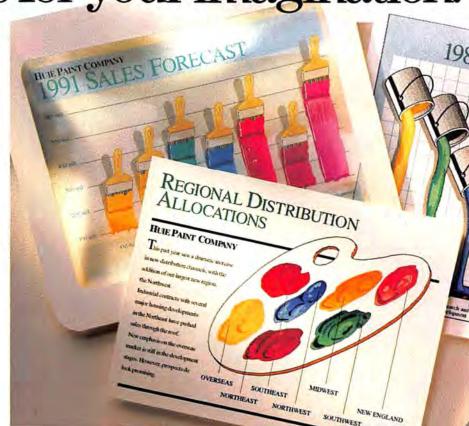
similar restrictive policies. But happily, Media Clip-Art and disc*imagery* have bucked that trend with two CD-ROM collections that include liberal manipulation and reproduction rights.

650 MEGABYTE CLIP-ART DISK The Media Clip-Art 650 Megabyte Clip-Art Disk carries a hefty list price of $499.95. Although it's advertised primarily as EPS clip art, 615 megabytes of the disc contain 182 TIFF scanned images, neatly arranged by topics in folders. The disc also holds 886 mostly color EPS files in Adobe Illustrator 88 format.

Many of the EPSF files are typical and unattractive examples of the clip-art genre. Some remind me all too strongly of images found in early John Waters or Russ Meyer movies. That's not to knock outré filmmaking (I'm as outré as the next guy), but just to warn you that some of the EPS files may be most suitable for, let's say, an audience of specialized tastes. By and large, the quality of the EPS graphics tends toward the amateurish.

Not only that, some of the images are stored in bizarrely inappropriate places. The graphic on this page, for example, was in the Children folder!

The 182 TIFF files, however, provide some useful material for desktop publishers. Many of these files are categorized by country, but there are also groupings of animals, space images, special effects, mountains, and so on. In many instances, the disc includes several versions of each TIFF image: 8-bit black-and-white and 24-bit color and 150 dpi and 300 dpi. The files range in size from 1 megabyte to more than 7 and are saved in PhotoMac TIFF format.
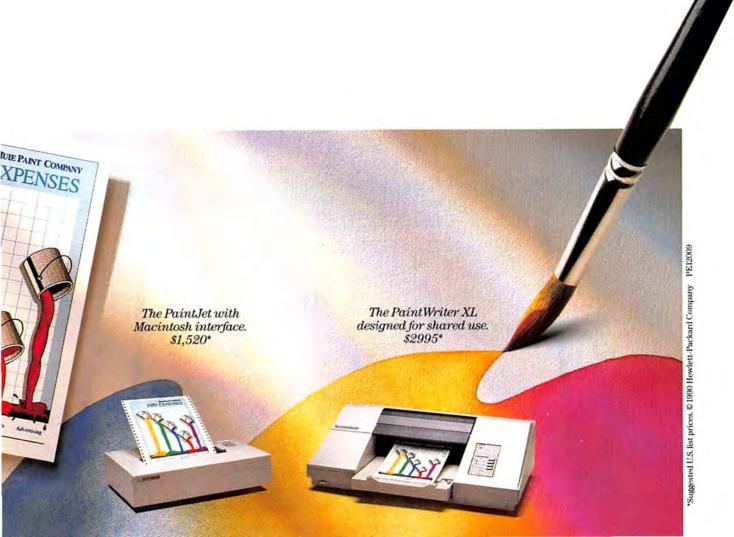
The quality of the scans is adequate, but many of the images are marred by washed-out colors or are too dark to be useful as they are. This provides fine fodder for those users who want to try out their retouching skills, but it adds considerably to the work involved. If I had paid almost $500 for this product, I would be hard-pressed to suppress the

Much of the EPS clip art on the Media Clip-Art CD-ROM disc is amateurish — at times it tends to the bizarre, as in this image called Bad Girl, oddly placed in the Children folder.

feeling that I had perhaps paid just a little bit too much.

THE PROFESSIONAL PHOTOGRAPHY COLLECTION, VOLUME 1 This CD-ROM disc from disc*imagery* may be more sparsely populated than the Media Clip-Art product, but it tends to be a better deal in many respects. First, the disc of 100 color TIFF images costs only $149. The collection is also available on 20 double-sided disks for $199. Each of the images comes in

The PaintJet with Macintosh interface. $1,520*

The PaintWriter XL designed for shared use. $2995*

Here's an example of the fine TIFF scans found on The Professional Photography Collection CD-ROM. In general, the TIFF images are very clear, and the printed catalog is a real time-saver.

three formats: 24-bit high-resolution color, 24-bit low-resolution color, and 8-bit black-and-white. A color catalog displaying each image accompanies the disc. The TIFF images themselves are strikingly clear and are of the highest quality. They range in size from 600K for the black-and-white files to 1.5 megabytes for the high-resolution 24-bit documents.

The theme of this first volume is varied, ranging from Americana to space, exercise, nature, still life, business, and urban scenes — definitely a mixed bag. Another similarly priced collection is currently under development and should be out by fall 1990. Volume 2 (Backgrounds, Textures, and Graphic Effects) will focus on textural images of water, marble, silk, and so on that can be used in layouts as backgrounds.

As with the Media Clip-Art offering, the disc*imagery* disc purchase price includes nearly unlimited rights to use the images. The only exceptions to this liberal policy are that you cannot use any of
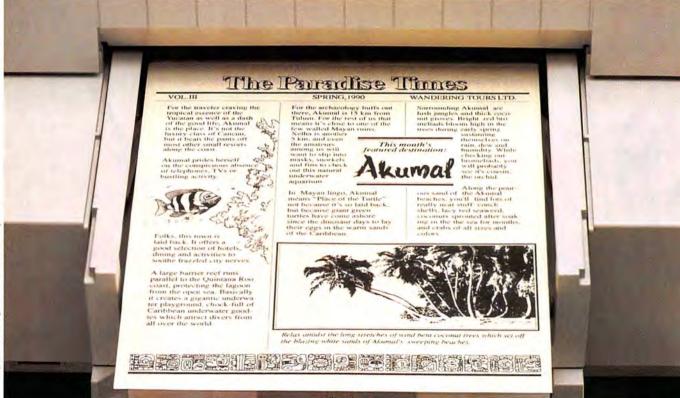
the files that contain fashion models in a sexually explicit or defamatory manner and you cannot resell any of the files as part of another collection.

The disc*imagery* disc also includes a demo version of PhotoMac 1.1 (you cannot save or output files with it) and a coupon for purchasing the real McCoy for $300 off the list price of $795.

If you're a desktop publisher in need of quality scanned images, you'll quickly come to appreciate disc*imagery*'s professional, high-class approach. The inclusion of a printed catalog (a far better method for deciding what file to use than accessing some clunky search engine), the liberal rights policy, and the surprisingly low cost for photos of this quality make this first volume an excellent buy.

THE BOTTOM LINE Of the two collections, disc*imagery*'s package is better by far. I recommend it without any reservation. The Media Clip-Art disc also deserves at least a look-see, but considering its hefty $500 price tag, you should be

With the HP DeskWriter, you can

sure to preview it to make sure the images are what you need.

— Gregory Wasson

MUSIC

NoteWriter II

If you're looking for an electronic music copyist, look no further.

NoteWriter II is a sister program to Passport's Encore (reviewed in the May '90 issue, page 61) and is designed solely for music notation. Unlike any other current major notation program, it doesn't read, write, or understand MIDI. It doesn't play back a file in any way, and it doesn't open sequencer files. As a matter of fact, it barely understands what music is, and that's the beauty of it. It is a completely non-rules-based program that depends on you to tell it where the music should go on the page. In essence, NoteWriter II is a music-drawing program: MacDraw Music, if you will.

NOTATION NOT KNOWLEDGE NoteWriter II lets you design score pages in any way you choose. The key word here is *flexibility*. If there are too many beats in a measure or if notes in the upper and lower staves of a piano part don't line up, it's your fault, but NoteWriter has a prodigious number of features that help you make sure these things don't happen.

NoteWriter uses what it calls the Command Line to get notes onto the screen. You select its commands by clicking on a picture of what you want, on the Image Palette directly below the Command Line, in the Command List, or in a

NoteWriter II is an electronic music copyist. Its basic windows include the Command Window; the Image Palette directly beneath it; and the Score Window, where notes are entered. Text objects are enclosed in gray boxes that don't print. (This score was designed for show, not to make musical sense.)

symbol library. Several symbol libraries, such as Avant Garde and Electronic/MIDI, are included with the program, and you can design your own symbols in a drawing program and store them in the symbol libraries for future use.

The more direct way to give the program a command is right from the Mac's keyboard: To draw an arpeggio, you type "arp"; "ferm" gets you a fermata; and so on. These commands are quite ingenious in that they're actually logical. For example, if you want a quarter note, press q and click on the staff; press e for an eighth note; s for a sixteenth note; and so on. How about a dotted quarter note with a sharp? Type "qsh." — the period represents a dot.

It's the same with articulations, and in NoteWriter's brand of visual onomatopoeia, you type what the articulation looks like, and you get it: ">" is an accent mark, "tr" is a trill (complete with horizontal wavy line), "o" is a harmonic, and so on. One of my favorites is multiple measure rests: Just type "=16" and you get a beautiful thick bar with a 16 in the middle.

There are several other ways of getting notes onto the screen besides clicking the mouse: You can play them from an on-screen keyboard à la Deluxe Music Construction Set or use the Mac's numeric keypad and keyboard. But the most fun and innovative method of note entry is to use NoteWriter's QuickScrawl, in which
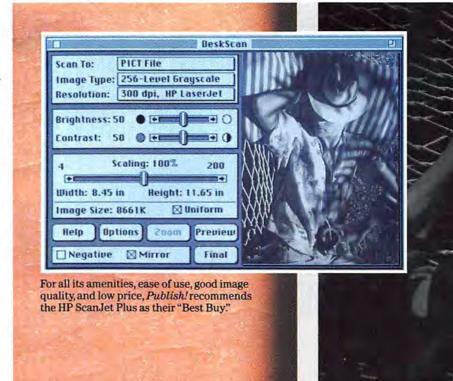
the cursor becomes a pencil, quill, or crayon. The musician uses what amounts to shorthand to get notes and rests onto the page. This simulates the way in which real music copyists, arrangers, and composers write music and is a kick to use besides. Other convenience features are available too, such as AutoBeam and Auto Grid alignment.

Selection is also logical. To select a note or group of objects, you use a marquee tool on the palette, which generates a black rectangle, just as every other Mac drawing program does. You can select irregular areas with a lasso tool and delete objects with an eraser tool.

The program uses "control points" on every object in much the same way that programs such as FreeHand and Illustrator do. Therefore, any object — notes, dynamics, text, beams, articulations, and key or time signatures — can be picked up and moved with ease. And quickly as well, because NoteWriter doesn't have to check complex music-theory algorithms

before every screen redraw. The only musical consciousness the program has is the ability to transpose notes by interval, key, or "free" transposition.

DOWNBEAT Because so many objects can be grouped, placed, or manipulated on-screen, and because of the resolution demands of the QuickScrawl mode, NoteWriter displays the score page in a slightly expanded 125-percent view, and you can't disable this feature. NoteWriter supports LaserWriters and Linotronic printing as well (the manual keeps referring to High Quality Print on the File menu, although there is no such menu item), but true WYSIWYG isn't possible. Also, there's no reduced view.

Other things I'd like to see: The manual desperately needs a tutorial, since it throws a lot of information at you. It should have a large command-reference card (like Finale's), because there are so many commands to pick from. The cumbersome part-extraction function needs to be overhauled. The Font menu

should display font names in alphabetical rather than in font-ID-number order. And it needs a lyrics mode; currently there is no way of linking lyrics to notes.

But the best thing that could happen to Mac musicians would be if Passport combined Encore and NoteWriter into one killer program.

THE BOTTOM LINE If you want to print scores exactly the way you'd like to see them printed, NoteWriter II is the program for you.

— **Ken Gruberman**

Get Info

NoteWriter II ♪♪♪♪
Published by: Passport Designs, 625 Miramontes St., Half Moon Bay, CA 94019; (415) 726-0280.
Version: 2.5.
List Price: $495.

got it made in the shades.

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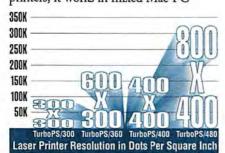
Text for the menu was created in PageMaker, saved as EPS files and placed in FreeHand.

The Images with Impact® clip art illustrations were edited with FreeHand and color was specified in cyan, yellow, magenta and black.

The Apollo logo was created in FreeHand where the various elements were edited and combined.

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UTILITIES

Now Utilities
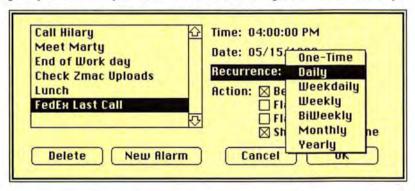
Now Software has cleaned up and bundled a dozen familiar utilities into one diverse package.
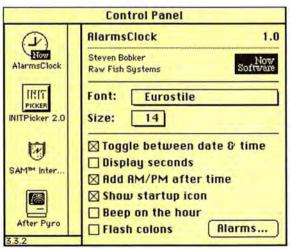
Now Utilities is one of the most eclectic packages in many a day. It consists of 12 assorted utilities — some productivity enhancers, some that simply make your desktop look prettier, and some that manage the programs provided (along with other similar programs you might already have). Many will be familiar to power users, BBS and on-line-service devotees, and user-group members. That's because Now has bought the publishing rights to many old favorites, cleaned them up, put a unifying polish on them, and created an excellent manual for the whole package.

GRAB BAG The centerpiece of the package is StartUp Manager, an INIT that gives you control of your other INITs, cdevs, and Chooser documents. As anyone who has lots of INITs and cdevs knows, conflicts among them are as inevitable as the sun's rising in the east. StartUp Manager lets you create sets of INITs and cdevs — for example, you can have a word-processing set and a data-acquisition set. The number of sets is limited by your needs, but you must reboot to install a new set.
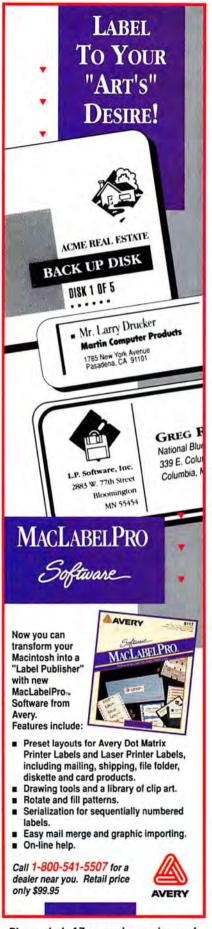
StartUp Manager works well. It does do one thing I wish it didn't, though: When it sets up, it puts a number followed by a space in front of the filename of each INIT and cdev. Now Software says this way of ordering INITs and cdevs is better than its competitors'. I don't see the advantage, and I do see one major

Now Utilities is a collection of a dozen utilities, many of which have been available in shareware versions. This is the AlarmsClock utility. The top window is the Alarms window, which pops up when you click on the Alarms button in the lower window. The lower window appears in the Control Panel and controls the font, size, and other details of the menu bar time/date display.

disadvantage. Some INITs (although none of the Now INITs) are stupid enough not to work if you alter their filename. The most egregious case is Exposure, the extremely handy and powerful screen saver. It won't run if StartUp Manager is active. Also StartUp Manager (and all similar programs) won't be needed when System 7 becomes available.

Profiler is very similar to MugShot (see Bobker's Dozen, September '89, page 302). It simply inspects your disks and RAM and tells you what System and ROM versions you're running and which INITs, cdevs, Chooser documents, and DAs are loaded. Its output is a text file. It's handy, and it works well.

NowMenus is the gem of the set. This improved version of the freeware DA-Menus (also known as HierDA) has two major functions. I use it many times a day for adding submenus to all the DAs in the Apple menu. The submenus consist of the DA's own menu. There's one special, ultra-useful case: the Control Panel. Here, the submenu consists of all loaded cdevs. I can now go directly to, say, Monitors or Sound. I don't have to wait for the Control Panel to open and then tediously scroll to the cdev I need. This feature alone is worth the price of the package. NowMenus' other ability is that it produces the menu bar as a pop-up menu anywhere on the screen after receiving a user-specified modifier-key and click. This is very useful for folks with 19-inch and larger screens.

RearWindow lets you get at files in inactive windows without making the rear window active. It works as claimed.

InstantAccess gives Open and Save dialog boxes pop-up access to the last ten folders used, the default folder of the application or DA currently in use, or any permanent folder. Users can also create "link sets," which are essentially custom work environments. Programs such as ShortCut and Boomerang also have these capabilities. If you run InstantAccess, you shouldn't run any other program with similar functionality.

MemorySetter lets you adjust a program's MultiFinder partition size as you launch it. Regular MultiFinder users know the value of this. MemorySetter is a simple one-function program that does exactly what it claims to do.
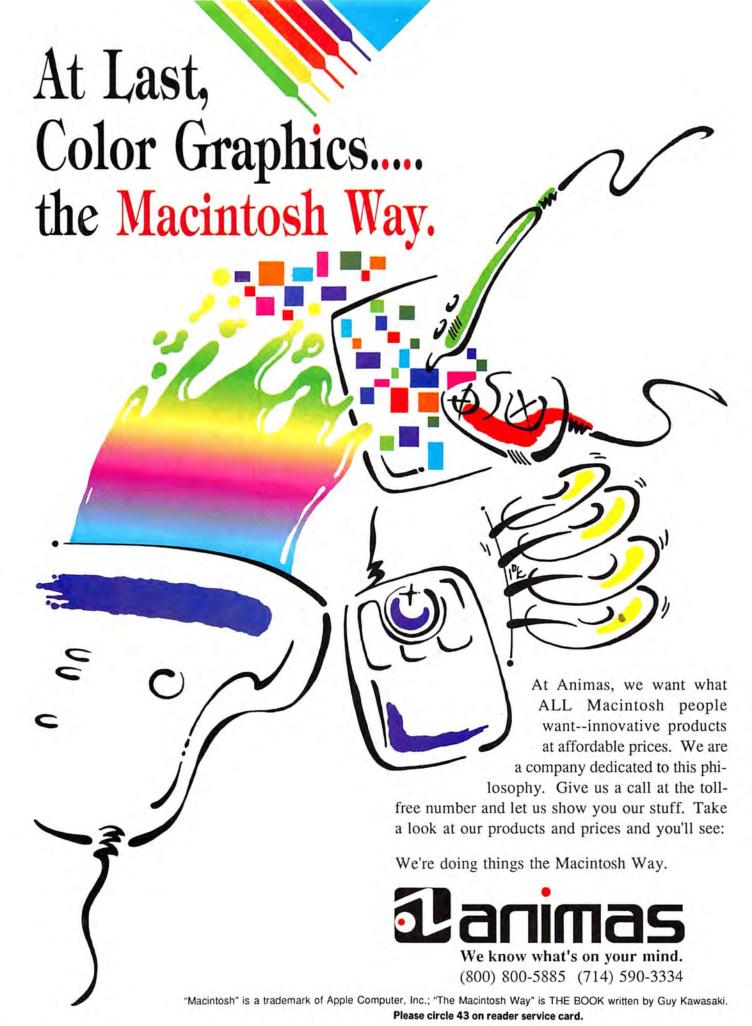
DeskPicture replaces the desktop pattern with a color or black-and-white illustration. The illustration you select must be in PICT format. DeskPicture works well. Although its selection panel shows the amount of memory your chosen illustration will use, Now doesn't warn you (either on-screen or in the manual) that this memory will effectively be lost from your RAM. Beware if you have limited RAM! An 8-bit-color PICT on an Apple RGB monitor requires more than 300K of RAM.

Customizer is a customized version of Layout, a public-domain favorite. It lets you define how all the various desktop views (icon, small icon, name, and so on) appear. You can set the grid, typeface, and type style. It also lets you time the animation of your cursor and turn some of the Finder's warnings on and off. It works well, although MultiFinder users will have to reboot under the Finder alone (hold down the Command key while booting) to use it. Customizer will not work with System 7, because System 7 has no layout resource.

AlarmsClock is a user-configurable clock that puts its display on the right side of the menu. You can set what is displayed (seconds or not, flashing seconds

| File | Edit | View | Special | Color |

About the Finder...
Set Aside Finder

✓ 🖥 Finder
🖼 Gin King
🔷 Microsoft Word
🔶 PowerStation™

Chooser
Control Panel ▶   INITPicker 2.0
DeskDraw™ ▶   □SAM™ Intercept
DeskPaint™ ▶   After Pyro
DeskPaint™ 2 ▶   CEToolbox
DeskPaint™ 3 ▶   Complete Undelete
DiskTop Find   CursorAnimator
DT Launch ▶   Mouse2
File Transfer Times   SuperClock!
Find File ▶   After Rival
Image Grabber™   AlarmsClock
Key Caps   Boomerang
Klutz   Capture
Laser Queue   Color
Letter Writer Plus™ ▶   DeskPicture 1.0
MacProof ▶   Exposure™
MacYahtzee   General
McSink ▶   InstantAccess
MenuKey   Keyboard
On Location   MemorySetter
Remember? ▶   Monitors
Scrapbook   Mouse
SmartScrap™ ▶   NowMenus
SuperViewerDA ▶   QuicKeys™
System Errors   SCSIProbe
Turbo DL   SharpenUp™
Vantage™ ▶   Sound
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NowMenus lets you see and access the commands on menus built into DAs without opening the DAs first. Here, the cdevs in the Control Panel's scrolling menu are directly accessible.

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BetaWatch
Products on the Horizon

WordPerfect 2.0 and **WordPerfect Office 3.0,** a new version of the WordPerfect word processor and a set of office-automation DAs, are the latest releases from WordPerfect. The word processor is a complete rewrite of the earlier Mac version. The four DAs are Mail, Scheduler/Calendar, Notebook, and File Manager.

WordPerfect, 1555 N. Technology Way, Orem, UT 84057; (801) 225-5000. WordPerfect 2.0, $395; upgrade pricing not set at press time. WordPerfect Office 3.0, pricing not set at press time.

ETA: Fall 1990.

colon, 12- or 24-hour time, and so on) and the typeface and size. It also provides a full set of alarm features, which are easily accessible through the Control Panel. AlarmsClock is very well behaved and works in the few places where its competition, SuperClock, tends to cause problems.
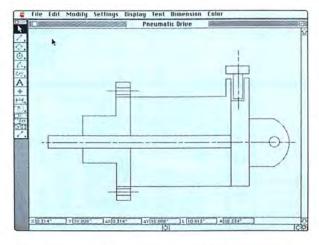
Print Previewer is a Chooser document that lets you see what your output will look like before you go to the trouble and expense of printing it. It comes with an Fkey so that you can easily invoke it with a keyboard command equivalent. It works well.

Persistence prevents the second (and
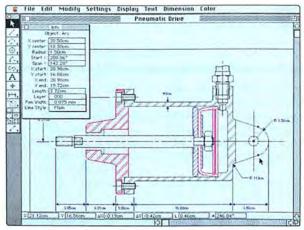
further) rows of INIT icons from overwriting the first row during startup, but it doesn't work with the new icl8 icons that are coming out and caused enough conflicts of its own that I deinstalled it.

WYSIWYG Menus causes font, size, and style menus to display in the actual typefaces, sizes, and styles. I found it nice,
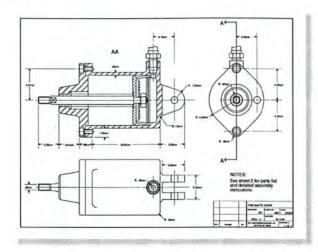
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but it noticeably slowed performance (I have a lot of fonts installed). Fortunately, it's easy to temporarily disable it.

THE BOTTOM LINE If, for lack of opportunity or lack of desire, you've not discovered the great small utilities that can make your Mac a better and more productive tool, Now Utilities is an excellent starter kit. Pick and choose the parts that work best for you, and you'll become more productive and probably have more fun.

— Steven Bobker

Get Info

Now Utilities ♟♟♟½
Published by: Now Software, 520 S.W. Harrison, Suite 435, Portland, OR 97201; (503) 274-2800.
Version: 1.0.
List Price: $149.

EDUCATION

The Playroom

Broderbund's package is a magically effective blend of education and entertainment for children.

The Playroom is a highly entertaining and educational program that teaches basic concepts with style. It is centered around a child-sized room furnished with a multitude of objects that spring to life with just a click. A fish blows bubbles in its bowl; a baby dinosaur wakes up; a bird sings on its perch; and The Playroom's host, Pepper Mouse, looks in the window. But that's only the beginning. Six of the room's objects lead into high-interest learning activities for the three-to-six-year-old set.

The Computer is a spelling and reading-readiness game that helps kids recognize uppercase and lowercase letters, locate them on a standard keyboard, and spell a word. Choosing from three levels, children select a short word in lowercase letters from the simulated Computer screen and then locate the matching uppercase letters on the keyboard. Then the word is pronounced aloud, and each letter of the word is pronounced phonetically. The reward for correctly matching the letters is a short animated sequence that prompts children to repeat the process with a new word.

The Cuckoo Clock introduces time measurement with simple but effective visuals. Children select a time on the clock face, and when the hands arrive at

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The Playroom is a terrific children's program. Its Computer guides kids into recognizing objects and typing related words, using a partially hinted keyboard. It then pronounces the typed words.

that time, they see a picture of what Pepper Mouse is doing at that moment — for example, at 2:00 in the morning, he's in bed sleeping; at 12 noon, he's eating his lunch. Time is presented in four ways simultaneously: analog, digital, written words, and chiming notes. On the hour, the program announces the actual time.

The Mousehole is a counting game that's simple to master as well as an ideal introduction to board games. If Junior can count to 4, he's ready for level 1. Click on the dice roller, and three dice appear, each showing a different number. Choose a number, and Pepper Mouse hops around the board the corresponding number of squares. (The computer controls the other player in one-player games.) If he lands on a white spot, you go forward. If he lands on a black spot, you go back. Kids seem to enjoy figuring out which numbers to choose so that Pepper will land on white spots and avoid black ones.

The Spinner Toy makes counting from 1 to 12 a breeze. Counting rockets or eggs is fine, but counting eggs that hatch squeaking dragons or counting rockets that blast off is better. Children select a number, say 5, from the number wheel and then choose what they wish to see five of from the object wheel. Another mode makes a random number of objects appear on-screen. If children correctly identify how many there are, they are rewarded with some snappy animation

and sound. If there's an error, no problem — Pepper slowly (very slowly) counts the objects aloud and highlights the correct amount. If Pepper ever has to count to 12, be prepared for a 20-second-plus wait. Despite that, the Spinner Toy is a first-rate counting game.

The Mixed-Up Toy is a highly amusing game that involves combining the head, torso, and legs from lots of different characters to create one fantastic being. The result usually gets plenty of howls and giggles. It's simple enough for even the youngest Mac user.

The ABC Book is a jewel. Children select one of three scenes — a kingdom, a neighborhood, or a country farm — and add characters and objects to the scene by clicking on one of the 26 letters of the alphabet. Choosing P in the kingdom scene, for example, produces a princess, followed by the written word *Princess* and the spoken word. Children can then place her anywhere in the picture. The letter U summons a unicorn, D invokes a dragon, and so on for each letter. The

objects are in the proper context for each environment. The ABC Book is a superb imagination booster. Children naturally think up stories to fit the scenes they're building.

THE BOTTOM LINE The Playroom strikes an ideal balance between education and entertainment. The only serious drawback to the package is its screwy copy protection. Children must solve a puzzle by looking up the appropriate answer in the back of the manual. The puzzle comes

up only on every fifth launch of the application, but imagine it coming up on an early Sunday morning with the manual nowhere in sight. This method is more inconvenience than protection, as it can be broken with 1 of 12 simple guesses or a copy of the back of the manual. Still, for the price of a couple of videocassettes, parents can give their children an experience that's far more valuable than the latest cartoon.

— **Rebecca Parascandolo**

The Playroom's ABC Book offers three build-it-yourself scenes into which a child can add contextually correct items.

Get Info

The Playroom ♟♟♟♟♟
Published by: Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101; (800) 521-6263.
Version: 1.0.
List Price: $49.95.

ENTERTAINMENT

McGee

Limited action choices and questionable activities combine to make McGee a less-than-ideal preschooler's program.

McGee is a nicely animated, if limited, entertainment designed for two-to-four-year-olds — the eponymous main character appears to fall somewhere within that age bracket. When you start the program, you're in McGee's room at sunrise and you watch him get up. He's the only one awake. Each screen that follows offers four options that you choose by selecting one of the large rectangular buttons. The buttons give an obvious depiction of what they enable McGee to do — bounce a ball, go through a doorway, look through a hole in the fence, dangle away on a tire swing, and so on. The menu bar disappears during game play, wisely restricting access to the rest of your system. You don't need the keyboard except to quit the game.

Each event plays well, complete with correctly synchronized shadows and life-

McGee is a severely limited children's program. With all there is to do in a kitchen, McGee can only throw the dog a bone, dial the telephone, or leave the room. That's entertainment?

like sounds, but the total package is limited. There are only seven scenes, each offering a scant four action choices. One choice always takes McGee back to where he just came from. Three of the

scenes use up a second of the four choices with a button that only exits to another room. Only 18 non-navigational actions are possible for the whole program, and each time you choose an action, it plays out exactly the same way.

THE BOTTOM LINE A two-year-old might have a grand old time for a while, but a four-year-old will quickly outgrow McGee's few and predictable options. It's a shame that the scenes are filled with points of interest that a child would naturally want to click on — and those points aren't playable parts of the program. And to make matters worse, it takes a frustratingly long time for the buttons in each changing scene to become clickable.

Also, some of McGee's activities aren't proper suggestions to make to a two-to-four-year-old for things to do before anyone else is awake — feeding the dog

a biscuit might be OK, but playing a music box that's on his still-sleeping mother's nightstand, dialing the telephone, taking a shower, or going out into the backyard so early and unsupervised are definite no-nos. McGee needs lots more — and wiser — options to occupy your child's time.

— Rebecca Parascandolo

Get Info

McGee ♟♟
Published by: Lawrence Productions, 1800 S. 35th St., Galesburg, MI 49053-9687; (800) 421-4157.
Version: 1.0.
List Price: $39.95.

Rumor Manager

Gossip, Guesses, and Goings-On

The Rumor Manager recently spent a very pleasant working vacation in the Seattle area. Microsoft has big plans for System 7. For one thing, it has no intention of letting Ashton-Tate back into the database ball game. Microsoft's long-rumored killer database manager is nearly a reality. In fact, I got a chance to see the current test version in action. It was a real treat, and all the other database publishers are correctly worried about it. It has everything: It's fully relational and has a really neat scripting and macro language that puts every other natural-language attempt I've seen to shame. During my brief look, I saw a full-featured accounting application and watched as a product built a very nice stock-tracking application in just a few minutes. This one has *winner* stamped all over it.

Word is also scheduled to be revised, and the feature list goes beyond that already in the DOS version 5.0. The new version will be called 5.5, or something like that, so the poor PC folks have something to look forward to. New features include a powerful and intelligent indexing submodule and a vastly improved outliner. Microsoft is also trying to greatly increase speed performance. The ability to run on 512K Macs will finally be lost, but the specs call for full speed and document-handling ability on Mac Pluses. If necessary, a private RAM cache will be automatically enabled. Microsoft Write will cease

to exist. (Not that it will be missed.)

Excel is going to pick up many presentation features from PowerPoint. Although version 3.0 won't have any of the new database technology, another version of Excel, planned for six months after the release of System 7, will use a lot of it. PowerPoint is finally getting extensive revisions, and although I didn't see the new version, I was told that the changes are so radical you'll hardly recognize the program.

File will also be rebuilt from the ground up and will essentially be a subset of the new database manager. It will remain a flat-file manager and will be aimed at casual and novice users. The kicker will be a transparent run-time module for the killer database product so that File will be able to run (but not modify) applications created with its bigger cousin.

Flight Simulator fans can look for System 7 compatibility, new planes, and absolutely no copy protection.

■■■■

The U.S. Mail address is Rumor Manager, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Our electronic addresses are MacUser (on MCI Mail) and 72511,45 (on CompuServe). No calls, please.

Prograph

Our 1989 Eddy award winner for best programming tool takes programming in a bold new direction.

Genuine innovation is rare. More often than not, new ideas are really just refined old ones. But every so often, someone breaks completely new ground, and TGS Systems does just that with Prograph. It's truly a new way to program, and the Mac is its first home.
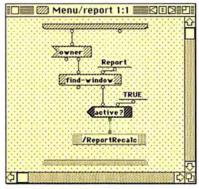
VISION Until now, programming has always been associated with writing endless lines of impenetrable (for normal people) code. Cranking it all out is a chore for professionals, and the mysterious-looking result is daunting indeed for nonprogrammers.

Prograph is the first completely visual programming language. Unlike CASE tools, which use flowcharts to generate conventional text-based code, every element in Prograph has meaning. There's no behind-the-scenes code generation or execution.

Each programming construct in Prograph has a unique pictogram associated with it. You can construct programs by connecting these icons, and the connecting links represent the way data flows in the program. As Prograph's data-flow-oriented design doesn't force a program to execute in a particular sequence, Prograph is eminently suitable for parallel processing.

Programmers may find Prograph a bit

Prograph is the first truly visual programming language. You build applications by connecting pictograms that represent Prograph constructs, and you can single-step through a project and find out exactly what's happening in your program.

disconcerting at first, but nonprogrammers should accept it readily, as they have no notions shaped by experience with other programming languages.

OOP 101 Prograph is an object-ori-

ented language. Object-oriented programming (OOP) is a method of software design that, among many other things, matches an application's operations to specific data types; this is called encapsulation. For example, subtraction is an operation that can be performed only on two numbers.

In addition to forcing programmers into a change of mind-set, OOP forces them to learn new terminology. For example, an *object* is an incarnation of a *class*, in much the same way a *variable* in a program is an incarnation of a *variable type*.

OOP also encourages you to reuse existing code. Once you've developed a class, the description of data, and the operations that may be performed on it, the code is self-contained and can often be reused in another program without change. Without encapsulation, code reuse is much more difficult.

Prograph ships with a set of system classes that make the construction of applications simple. By building on the framework of the supplied system classes, users can design an application's user interface in full WYSIWYG. Menus and other standard Mac-application user-interface elements can be built on-screen and linked to the appropriate Prograph constructs with a few clicks and drags. You can also step through your application and trace the data flow to find out where any mistakes lie.

INTERPRETING 101 One of the penalties of Prograph's interactivity is that the language is interpreted. As with Hyper-Card, you need Prograph to run any Prograph application. And once an application is finished, it is by no means blindingly fast. Fortunately, Prograph was designed from the start as a compilable language.

By the time you read this, Prograph 2.0 and its compiler should both be available, making possible true stand-alone applications. The compiler will generate native 68000 code and won't just automatically incorporate a run-time interpreter, so you'll get real code.

THE BOTTOM LINE Prograph is novel in many respects. Traditional programmers may balk at its originality, but novices should take to it more readily. Although it's a high-level language, it still provides direct access to the Mac Toolbox, and programmers can get as down and dirty as necessary.

Prograph is a clear sign of things to come. If your aim is to learn about programming, you can't afford to overlook it.

— Stephan Somogyi

Get Info

Prograph ♣♣♣♣
Published by: TGS Systems,
1127 Barrington St., Suite 19,
Halifax, Nova Scotia B3H 2P8,
Canada; (902) 429-5642.
Version: 1.22.
List Price: $195.

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FON 0245 Sabon Roman / Sabon Italic / Sabon Bold / Sabon Bold Italic **NEW!**

FON 0244 VAG Rounded Thin / VAG Rounded Light / VAG Rounded Bold / VAG Rounded Black **NEW!**

FON 0255 Berthold Walbaum **NEW!** / Berthold Walbaum Italic / Berthold Walbaum Bold / Berthold Walbaum Bold Italic

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FON 0157 Eurostile / Eurostile Oblique / Eurostile Demi / Eurostile Demi Oblique / Eurostile Bold / Eurostile Bold Oblique

FON 0152 Futura Light / Futura Light Oblique / Futura Book / Futura Book Oblique / Futura Bold / Futura Bold Oblique

FON 0159 Futura / Futura Oblique / Futura Heavy / Futura Heavy Oblique / Futura Extra Bold / Futura Extra Bold Oblique

Adobe Illustrator 3.0

The page creation and layout solution! New text-handling and graphics tools allow direct, on-screen entering and manipulation of text. Also automatic creation, manipulation and customization of charts. Includes FREE copy of Adobe Type Manager. Our low price is just .... $357!
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FON 0282 Utopia Regular / Utopia Italic / Utopia Semibold / Utopia Semibold Italic / Utopia Bold / Utopia Bold Italic / Utopia Black **NEW!**

Suggested Retail: $275 **$179**

FON 0288 Adobe Garamond Regular / Adobe Garamond Italic / Adobe Garamond Semibold / Adobe Garamond Semibold Italic / Adobe Garamond Bold / Adobe Garamond Bold Italic **NEW!**

Suggested Retail: $275 **$182**

FON 0238 ITC Berkeley Oldstyle Book / ITC Berkeley Oldstyle Book Italic / ITC Berkeley Oldstyle Medium / ITC Berkeley Oldstyle Medium Italic / ITC Berkeley Oldstyle Bold / ITC Berkeley Oldstyle Bold Italic / ITC Berkeley Oldstyle Black / ITC Berkeley Oldstyle Black Italic **NEW!**

FON 0160 Futura Condensed Light / Futura Condensed Light Oblique / Futura Condensed / Futura Condensed Oblique / Futura Condensed Bold / Futura Condensed Bold Oblique / Futura Condensed Extra Bold / Futura Condensed Extra Bold Oblique

FON 0117 Helvetica Condensed Light / Helvetica Condensed Light Oblique / Helvetica Condensed / Helvetica Condensed Oblique / Helvetica Condensed Bold / Helvetica Condensed Bold Oblique / Helvetica Condensed Black / Helvetica Condensed Black Oblique

FON 0237 Hiroshige Book / Hiroshige Book Italic / Hiroshige Medium / Hiroshige Medium Italic / Hiroshige Bold / Hiroshige Bold Italic / Hiroshige Black / Hiroshige Black Italic **NEW!**

FON 0239 New Aster / New Aster Italic / New Aster Semi Bold / New Aster Semi Bold Italic / New Aster Bold / New Aster Bold Italic / New Aster Black / New Aster Black Italic **NEW!**

FON 0150 Univers Light 45 / Univers Light Oblique / Univers 55 / Univers Oblique / Univers Bold 65 / Univers Bold Oblique / Univers Black 75 / Univers Black Oblique

Suggested Retail: $370 **$239**

FON 0180 ITC Clearface Regular / ITC Clearface Regular Italic / ITC Clearface Bold / ITC Clearface Bold Italic / ITC Clearface Heavy / ITC Clearface Heavy Italic / ITC Clearface Black / ITC Clearface Black Italic

Suggested Retail: $370 **$245**

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MUJ0A

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If You Can Find A Better Deal In Hard Drives . . .

MORE 3.0 (Symantec Corp.) Producing backbreaking reports got you ahead, staying there requires MORE! MORE 3.0 combines outlining, word processing, desktop presentations and financial charting so concepts zoom from your "doodle" pad to the board room in no time. A single step transforms ideas into bullet or tree charts. Over 100 templates and layouts simplify the formatting of all your documents. MORE's Chart Tutor even provides step-by-step instructions on preparing everything from overhead transparencies to 35 mm slides. (business) **$265.**

Inside Information (Microlytics) Consider your Thesaurus *extinct!* Inside Information is the next evolutionary step in language organization for the electronic age. This essential desk accessory contains over 65,000 words logically organized in a hierarchical dictionary containing seven general word classes broken down into respective sub classes, categories and subcategories. Access information by scrolling through, clicking and expanding on topics organized in four logical formats. Perfect for research writing or boning up on topical "Buzz" words for presentations. (desk accessories). **$69.**

ACCESSORIES

Abcom (full line available)
Dust Covers .... starting at 10.
American Power Conversion
110 SE UPS .... 219.
370 ci UPS .... 349.
Basic Needs, Inc.
HardCovers Keyboard Covers .... 15.
HardCovers ImageWriter .... 17.
Keyboard Flip .... 6.
Dust Covers - Grey Nylon Ripstop
Mac Plus and keyboard .... 11.
Mac SE & extd. or reg. keyboard ...... 11.
Mac II and extd. keyboard .... 12.
Mac IIcx/ci Monitor Stand .... 40.
Universal Laser Printer Stand .... 28.
Utility Pac .... 11.
Computer Giftware
Mouse Pads .... starting at 12.
Curtis
Command Center .... 89.
Computer Tool Kit (52 pc.) .... 49.
Ergotron
MacTilt-SE .... 68.
MacTilt II-RGB .... 75.
I/O Designs
Imageware II Carrying Case .... 49.
Macinware IIcx Carrying Case .... 85.
Macinware Mac II Carrying Case ...... 99.
Macinware Plus Carrying Case .... 64.
Macinware SE Carrying Case .... 75.
Monitorware Apple RGB Case .... 79.
The Ultimate SE Carrying Case .... 79.
The Ultimate Neon Carrying Case .... 89.
Kensington
Anti-Glare Filter .... 33.
Apple Security System .... 34.
LaserWriter II Security System .... 32.
MasterPiece Mac II .... 105.
PowerBacker 360 UPS Line .... 269.
PowerBacker 800 UPS Line .... 749.

SE Radiation Shield .... 54.
System Saver Mac .... 63.
Mobius Products
Fanny Mac QT .... 55.
SE Silencer .... 39.
Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) .... 69.
ImageWriter II Case (black) .... 45.
Mac Plus/SE Case (black) .... 55.
IIcx /IIci Case .... 75.
Premier Leather Case .... 175.

Mouse Pads (Computer Giftware) For sophistication during hours - and excitement after! **Executive Pads** put the elegance of marble on your desk. These pads look like the real thing but only your mouse knows for sure! Choose from White Italian Marble, Green Marble, Granite, and even Kentucky Burlwood. **$12.** After the grind why not invite a Bikini-clad California Girl or Volley Ball Hunk over to your **Bachelor or Bachelorette Pad**? **$13.** The truly daring may even opt for an exciting adventure with **Indiana Jones. $15.** (accessories)

Intuit
Quicken 1.5 .... 35.
Layered, Inc.
at Once! .... 285.
MECA
Managing Your Money .... 122.
Monogram
Business Sense .... 269.

Nolo Press
For The Record .... 29.
WillMaker .... 32.
Reality Technologies
Wealthbuilder .... 165.
Survivor
MacMoney 3.5 .... 59.

BLANK MEDIA

B.A.S.F. made in U.S.A
DS/DD (box of 10) .... 14.
DS/High Density (1.44 Meg) .... 24.
Sony
DS/DD (box of 10) .... 13.
DS/HD (1.44 mb) .... 24.

BUSINESS & PRESENTATION

A Lasting Impression
ResumExpert (word vers.) .... 39.
Cover Letters or Students .... ea. 39.
Managers or Sales & Marketing .. ea. 39.
Healthcare or Finance & Banking ea. 39.
Education or Arts & Leisure .... ea. 39.
Comp. Sciences & Engineering .... 39.
AEC Management Systems
FastTrack Schedule 1.5 .... 139.
Aldus
Persuasion 2.0 .... 329.
Claris
MacProject II .... 365.
SmartForm Designer w/Assistant .... 289.

ACCOUNTING & PERSONAL FINANCES

Aatrix
Checkwriter II 2.8 .... 37.
Payroll 3.5 .... 109.
Payroll PLUS or TimeMinder .... 175.
Absolute Solutions
Computerized Classic Accounting .. 225.

Macintosh SE/Plus w/Extended Keyboard Carrying Case (Targus) Pamper your Mac with a Targus case made of Zilicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. Plus there's room for everything from your Mac, a hard disk drive, and the extended keyboard to pockets for your mouse, floppies, cables, and pens. (accessories) **$69. Full line available.**

ATLAS*MapMaker Version 4.5 (Strategic Mapping, Inc.) Put your business on the map! ATLAS*Mapmaker 4.5 quickly displays hidden relationships in geographic data with striking color graphics. Includes everything you need to map the U.S. & the world by a wide variety of criteria. Import your own data or use the U.S. Census statistics included. Use ATLAS*MapMaker to read ZIP-coded "name and address" files, then aggregate their data into essential information for target marketing and more. (graphics) **$295.**

MORE FOR YOUR MONEY...

MegaScreen Rival (MegaGraphics)
MegaScreen Rival — Macworld Magazine's "First Choice" in black-and-white big screens. Combined with our excellent price, we rate this WYSIWYG two-page system your BEST BUY. 1024 x 826 resolution; flicker-free 75 Hz refresh. Interface cards and cables included. Compatible with Mac Plus, Mac SE, Mac SE/30, and all Mac II models. See line listing for additional MegaScreen systems. (hardware) **$1,275.**

Altsys
Fontastic Plus 2.02	51.
Fontographer 3.05	249.
Metamorphosis	149.
The Art Importer 2.0	89.

Dubl-Click
Menu Fonts 3.0	28.

Letraset
LetraStudio	275.
LetraFonts (various)	ea. 69.

WIZ (CalComp)
Everything else is just a mouse! It's a full featured mouse system, compatible with all mouse driven packages. Not only do you have mouse features, but the ability to draw and trace with accuracy, because WIZ has 1000 dpi, absolute positioning and comes with a cross hair pointer on the WIZ mouse. Define macros, minimize wrist movement with adjustable pad scaling. Optional software templates for over 19 software packages, lets you by-pass pull-down menus, making command selection a one click process. Requires Mac II/SE. 5 year MFG. warranty. (input/output) **WIZ tablet $159, Optional templates $33 each. Optional 2 button pen $57.**

Tactic Software
ArtFonts	55.

GRAPHICS & DESIGN

3G Graphics
Graphics & Symbols 1	50.
Business 1 or Accents & Brdrs 1	ea.65.

Adobe
Illustrator 3.0	357.
Photoshop	499.
Smart Art I, II, III, or IV	ea. 84.
Streamline	225.

Aldus
Freehand 2.0	329.

Aperture Technology
Aperture Visual Information Mgr.	729.

Bright Star Technology
HyperAnimator 1.5.1	98.
interFACE	249.

Broderbund
TypeStyler	119.

Claris
MacDraw II	289.
MacPaint 2.0	93.

Deneba
Canvas 2.1	189.
Ultra Paint	125.

Digital Vision
Computer Eyes B&W	199.
Computer Eyes Pro Color	349.

Dream Maker
Cliptures, Business Images	69.
MacGallery	27.

Electronic Arts
Studio/1	96.
Studio/8	295.
Studio/32	Call.

Farallon
MediaTracks	189.

Innovative Data Design
Dreams	319.

Letraset
Shapes	Call.

MacroMind
MacroMind Director	439.

Metro ImageBase (Full Line Available)
Art Deco or ReportMaker	ea. 85.
Newsletter Maker or Business	ea. 85.

Micro Frontier
Enhance	235

Multi Ad Services
Multi-Ad Creator	865.

ThunderScan Plus ThunderWorks (Thunderware)
Turn your ImageWriter into a gray scale scanner. Import images into desktop publishing, painting, drawing or OCR programs. Scans in 64 gray levels, edits grays, and comes with 13 special effect filters. **$199.**

Lightning Scan 400 with ThunderWorks
Most powerful hand-held scanner for the Mac. Scans flat surfaces instantly. Includes ThunderWorks image editing software for full-page scanning and DA for scanning in any program. Saves in 37 gray levels. Includes SnapGuide and RAM buffer. (input/output) **$385.**

Mac286 v3.0/Co-Processor
Free Nubus slots while running MS-DOS applications from your Mac II. The Mac286 card slips into a single Nubus slot and provides up to 4MB of RAM to run MS-DOS software in a separate widow. Provides IBM AT productivity, compatibility with MultiFinder and true multitasking. (drives/boards) **$1079.**

Bulk Mailer 3.25
The ideal mail list management system. Contains duplication elimination, various sorting capabilities and search codes. Can utilize all fonts and styles, mail merge, envelope printing, plus much more. Works great with Canadian postal codes and other international mailing requirements.(business) **$75.**

MicroPhone II 3.0
MicroPhone II scripting language makes using electronic mail services an automatic operation. Other types of file transfers are equally effortless. MicroPhone II 3.0 now supports the hot new ZMODEM, transfer protocol (in addition to XMODEM, YMODEM, KERMIT, and MacTerminal 1.1) and can operate modems at any speed from 50 to 57,600 baud. (communications) **$215.**

Bullseye
Ferrari Grand Prix or P51	ea 32.
Fokker Tri-plane	23.

Centron Software, Inc.
BlackJack or CrapsMaster	ea 27.
BlackJack Strategy Tester	65.
CasinoMaster (5 pack)	49.
CasinoMaster Deluxe Mac II version	55.

MicroLeague Sports
MicroLeague Baseball II	38.

Softstream
22nd St. Whist Tutor or MacRummy	32.

Spectrum Holobyte
Tetris	22.
Welltris	19.

The Software Toolworks
ChessMaster or Life & Death	ea. 32.
Cribbage & Gin King	39.
The Hunt for Red October	20.

Three Sixty
Sands of Fire	32.

Toyogo's Nemesis
Go Master	49.
Joseki Genius	30.
Tactical Wizard	37.
Deluxe	99.

Visionary Software
Synchonicity	39.

XOR
Lunar Rescue or MacGolf 2.0	34.
MacGolf Classic	52.
Road Racer	39.
NFL Challenge	55.
TaskMaker	29.

FONTS

Adobe (Full line available)
Adobe Type Manager 2.0	55.
Adobe Type Reunion	39.
Plus Pack	109.
TypeAlign	59.
Type Set 1 or Type Set 2	ea. 58.

SuperLaserSpool 2.02 (SuperMac)
Now spools to HP DeskWriter printer. One of the best selling print spoolers for the Mac is here! You get your Mac back seconds after sending a document to the printer. Prints in the background. Handles large and complex graphics, spreadsheet or database documents. Special desk accessory allows you to see and manipulate the print queue; delete documents, reorder documents to other printers. Also works with all Apple printers and postscript devices using the Apple printer drivers. (utilities) **$87.**

Metamorphosis (Altsys)
Metamorphosis converts PostScript fonts into a variety of formats, now including Type 1 (ATM-compatible!). Edit, modify, or regenerate your PostScript fonts. Manipulate type outlines in Aldus Free-Hand or Adobe Illustrator to create special font effects.
Metamorphosis converts your Type 3 fonts into Type 1 format for more accurate viewing in screen when using Adobe type Manager and more precise printing on any PostScript printer. **$149.**

The Art Importer
Sold! When it comes to collecting imported art, serious Mac users give their high bid to The Art Importer. Use the Art Importer to create high resolution PostScript fonts from Mac artwork. The fonts are compatible with most Mac applications. (fonts) **$89.**

Quark XPress 3.0
New measurement and page palettes provide interactive on-screen access. A library stores frequently used items, and a pasteboard provides a work area next to each page. Rotate text and graphics in 0.001 degree increments up to 360 degrees. (desktop publishing) **$519.**

Fontographer 3.1
Reads and writes Type 1 PostScript fonts! Create & edit downloadable PostScript fonts containing standard alphanumeric and foreign characters, pictograms, icons, and logos. The auto-trace function to saves time when working with scanned characters and images. (fonts) **$249.**

Synchronicity
This Mac realization of the ancient Chinese book of changes (I Ching) provides needed moments of serenity on busy days. Animation and sound effects send users into peaceful moods while requesting key words to reference several thoughtful passages. (education) **$39.**

Computerized Classic Accounting (Absolute Solutions)
Mimicking the paper journals and ledgers that bookkeepers and accountants are accustomed to, Computerized Classic Accounting provides a remarkable level of accounting, record keeping and analysis, in a simple, flexible product that can be easily customized. CCA is the only true, fully integrated spreadsheet accounting product. CCA was nominated by Macuser for an Eddy and has earned a 4-1/2 mouse rating. (accounting) **$225.**

Paracomp	
DrawTools	64.
Swivel 3D 1.1	295.
Silicon Beach	
Digital Darkroom	248.
Super 3D 2.0	315.
SuperPaint 2.0	125.
SoftStream	
Relational Objex	150.
Somak	
LaserArt CD-ROM #1 or #2	ea. 59.
Sharpen Up	59.
Strata	
StrataVISION 3d	375.
Strategic Mapping, Inc. (Select Micro)	
Map Maker 4.5	295.
Studiotronics	
Colorset 1.5	229.
SuperMac	
PixelPaint 2.0	225.
PixelPaint Professional	389.
Tactic Software	
Art Clips Vol. 1 or Vol. 2	Call.
T/Maker	
Click Art Business Images	32.
EPS Illustrations	85.
Business Cartoons	33.
Zedcor	
DeskPaint & DeskDraw	115.

HARDWARE & PERIPHERALS

Aapps	
DigiVideo	399.
MicroTV	265.

General Computing Company	
WriteMove Ink Jet Printer	575.
MegaGraphics	
Rival 2001 System for Mac II	1275.
Rival 3001 System for Mac SE/30	1275.
Rival SE System for Mac SE	1275.
Rival Plus System for Mac Plus	1310.
19" Color 2008 Hi-Res/Mac II	4460.
16" Color 2008 Hi-Res/Mac II	3525.
Grayscale 2008/Mac II	2210.
Grayscale 3008/Mac SE/30	2399.
Microtek	
Microtek MSF-300GS Scanner	1589.
Microtek MSF-300Z Scanner	1998.
NEC	
Intersect CDR-35	419.
Qume	
Crystal Print Publisher	2900.
Seikosha America	
Seikosha Printer (dot-matrix)	235.
Sharp	
The Wizard	229.
ThunderWare	
LightningScan 400	385.
ThunderScan Plus	199.

HYPERWARE

Bantam	
Complete HyperCard Handbook	22.
Beacon Technologies	
HyperBible International Version	175.
HyperBible King James Version	145.
DataDesk International	
HyperDialer	39.
ICOM Simulations	
HyperTMON	59.
MicroMaps	
HyperAtlas	59.
Silicon Beach	
SuperCard 1.5	189.
Softstream International	
HyperHit	125.
Somak	
Script Edit	49.
Symmetry	
HyperDA 1.2	45.
TimeWorks	
HyperWorks Organizer	57.

INPUT/OUTPUT

Calcomp	
WIZ Tablet	159.
WIZ Pen	57.
WIZ Templates	ea. 33.
CH Products	
Mach IV Plus Mouse/Joystick	49.
Mirage Adaptor	35.
Roller Mouse ADB	75.
DataDesk Intl.	
DataDesk Switchboard	175.
Mac 101 Keyboards	129.
Forte Communications	
Remote Keyboard/Mouse	269.
Kensington	
New Turbo Mouse	109.
Keytronics	
MacPro Keyboard	118.

MacEnvelope 5.0 (SYNEX)
Prints labels or envelopes from your data-base or word processor address lists. MacEnvelope's WYSIWYG display, Postal Bar Coding, Desk Accessory and 100 preformatted templates (Avery et al.) makes short work of all your mailing chores. Stores up to 1600 addresses per file, sorted alphabetically or by ZIP code. **$57.**

MacEnvelope Plus 2.0
Maintains up to 100,000 names per file. Provides additional list management features including comments, flags, and multilevel sorts. (business) **$159.**

Kraft	
ADB Joystick Premium III (SE&II)	49.
QuickStick	39.
Trackball	79.
LYNX	
QuadLYNX Trackball	59.
MicroSpeed	
MacTrac ADB	**NEW** 75.
Micro Touch	
The UnMouse	189.
Mouse Systems	
A+ Mouse (SE/II) or (512, Plus)	ea. 58.
Practical Solutions	
The Cordless Mouse	89.
Mouse Master	57.
Summagraphics	
Bit Pad Plus	319.

LANGUAGES

Digitalk, Inc.	
Smalltalk/V MAC	125.
Microsoft.	
QuickBasic	64.

The Microsoft Office (Microsoft)
The Microsoft Office gives you everything you need to increase productivity ,word processing (Microsoft Word), spreadsheet (Microsoft Excel), desktop presentations (Microsoft Power Point), and electronic mail (Microsoft Mail) - in one compact package! Each program is a top-selling stand alone product, and when used together, will make your entire office more efficient and productive. (business) **$525.**
Also available on CD-ROM **$669.**

The Microsoft Office
Microsoft Word
Microsoft Excel

NETWORK BUNDLE FOR MACINTOSH
File Sharing • Mail • Printing

Shana Corporation
Inside Out .... 369.
Symantec
THINK'S C 4.0 or Pascal .... ea. 168.
Zedcor
ZBasic 5.0 .... 88.

MEMORY UPGRADES/ ACCELERATORS

1 MEG SIMMS
Low Profile, 120ns High Quality Single In-Line Memory Modules for MacPlus, SE, II, IIx.
2 yr. Warranty. .... **Low price $79.**
For MacPortable .... 435.
For IIfx - 80ns .... 119.
For LaserWriter II NTX - 80ns .... 119.

Dove (full line available)
MaraThon 030 Accelerators .... 449.
MacSnap 2S .... 199.
MacSnap 4S .... 399.
MacSnap 8S .... 799.
MacSnap 524E .... 185.
MacSnap 524S .... 239.
MacSnap 548S .... 499.

MODEMS/FAX

Abaton
InterFax12/48 .... 265.
InterFax 24/96 .... 419.
Best Data Products
SmartOne 2400/1200 .... 145.
Dove
DoveFax desktop .... 279.
DoveFax Networkable desktop .... 375.
DoveFax Nubus .... 449.
Networkable Nubus .... 749.
Hayes
Smartmodem 2400 .... 349.
Smartmodem 9600 (V series) .... 759.
Power User™
2400 baud modem .... 99.

KeyPlan (Symmetry)
PLAN WITHOUT PAIN! Meet the new champion in planning software. Now you can turn fast outlines into successful deadlines. With the speed and ease of use for the light user, power and sophistication for the professional manager (PERT and Gantt charting capabilities) KeyPlan allows you to plan and budget your way to success. From outline to deadline! Creates plans quickly and easily, tests feasibility of ideas, helps implement and track plans, communicates your srategies and plans more effectively. (business) **$275.**

TOPS 3.0 Network Bundle (TOPS)
TOPS 3.0 provides a complete network/E-Mail solution for any combination of Macs, IBM PC's and Sun workstations. With TOPS, every computer is a server and each user decides which files are public or private. TOPS follows AppleTalk File Protocol, so AFP-compatible multi-user applications will run properly. Includes TOPS Spool for background printing on the network, and a 20-user package of InBox 3.0 (networking) MAC **$187** or DOS **$165**

Prometheus
2400 Mini Fax .... 209.
ProModem 2400 SE Int. .... 209.
ProModem 2400M .... 199.
ProModem 2400M II .... 205.
Travel Modem .... 205.
Supra
Supra Modem 2400 .... 129.

MUSIC AND SOUND

Altech
MIDI Interface .... 59.
Coda
Finale 2.0 .... 559.
MacDrums .... 31.
Perceive .... 49.
Electronic Arts
Deluxe Music Construction 2.5 .... 85.

Deluxe Recorder .... 99.
Farallon Computing
MacRecorder (records sound) .... 159.
Screen Recorder .... 125.
Passport Designs
NoteWriter .... 325.
Passport MIDI Interface .... 89.
Primera Software
Different Drummer .... 59.
Repertoire
Music Publisher .... 359.
Resonate
Listen 2.0 .... 62.
Tactic Software
Sound Clips Vol. 1 or 2 .... ea. 49.

SECURITY & VIRUS PROTECTION

ASD Software, Inc.
FileGuard Extended .... 139.
FileGuard Office 5-pack .... 435.
FileGuard Office 10-pack .... 685.

AutoSave II (Magic Software)
This very important utility is a CDEV. Just drag it into your system folder, and AutoSave II will issue a periodic Save command to the running application. You can set the interval between saves from one to 99 minutes. AutoSave II keeps your current work safe on disk. (utilities)**$28.**
BackMatic
BackMatic automatically backs up your files at a time you specify, including when you shut down your Mac. You can configure it to backup only the files you've changed, or all your most important files. Make backups to floppy disks, hard disks, or file servers. Install this handy INIT in your system folder, and your work will always be safe off disk. (utilities) **$50.**

Fifth Generation
Disk Lock 106
HJC/Microcom
Virex 2.7 .... 56.
Kent Marsh
MacSafe II .... 107.
NightWatch .... 86.
QuickLock .... 56.
Mainstay
AntiToxin .... 59.
Symantec Corporation
S. A. M. .... 67.

SmartOne 2400/1200 Modem (Best Data Products)
For beginners and experienced modem users. If you need a 2400 baud modem, the SmartOne 2400 Modem provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/originate, 300, 1200 and 2400 baud operation, pass-through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes software and cable. (modems) **$145**

SPELLING/DICTIONARY THESAURUS CHECKERS

Deneba Software
BigThesaurus .... 64.
Spelling Coach Pro 3.1 .... 125.
Electronic Arts
Thunder II .... 49.

Casino Master (Centron)
Let it Ride! You can bet on having hours of fun with Casino Master's five exciting casino games. Includes **Blackjack Ace, Crapsmaster, Roulette Master, Pokermaster** and **Baccarat Master**. Exact table simulation, mouse controlled betting, stored win/lose statistics and complete manual. Mac II version in full color! An odds-on favorite with professional gamblers. Individual games **$27.** / 5 game Casino Master Package **$49.** / Deluxe Mac II version **$55.**
New! BlackJack Strategy Tester
Test your betting and playing strategies over thousands of hands. Card counting, 1-8 decks, 1-7 players. Develop a winning strategy, practice it with Casino Master or BlackJack Ace, then go to the casino with confidence. (entertainment) **$65.**

Lexpertise
MacProof 3.2.1 .... 115.
LifeTree
Correct Grammar .... 49.
Microlytics
Word Finder 2.0 .... 34.
Sensible Software
BookEnds or Sensible Grammar .... 51.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II .... 279.
StatView SE+Graphics .... 199.
SuperANOVA .... 309.
Wolfram Research
Mathematica (SE) .... 450.

UTILITIES

Abbott Systems
CanOpener 1.1 .... 64.
Aladdin Systems Inc.
Programmer's Assistants .... 75.
Shortcut .... 46.
StuffIt Deluxe .... 63.
ALSoft
DiskExpress II .... 57.
MultiDisk .... 49.
Master Juggler .... 64.
American Power Conversion
Power Chute .... 67.

UltraScript (QMS)
Unleash the power of your current printer with UltraScript. Now you can have affordable PostScript language printing on virtually any laser, ink jet, or dot matrix printer - even an ImageWriter! Generate scalable, rotatable fonts. Print high quality text and graphics directly from within your applications. Save much more when purchasing additional fonts licensed from the same sources as Adobe. UltraScript for the Macintosh includes 15 typefaces. (utilities) **$115. / UltraScript Plus $259.**

CE Software
DiskTop 4.0 or QuicKeys 1.2 ...... ea. 64.
Caere
OmniDraft or OmniSpell .... ea. 70.
OmniPage .... 545.
Central Point Software
Copy II Mac .... 23.
Mac Tools Deluxe .... 75.
Custom Applications
Freedom of Press 2.4 .... 255.
Dantz Development
Retrospect .... 149.
Dayna Communications
DOS Mounter .... 55.
Fifth Generation
FastBack II .... 106.
PowerStation 2.5 .... 33.
Suitcase II .... 43.
HJC/Microcom
Virex 2.7 .... 56.

Peter Norton Utilities
Norton Utilities for the Mac .... 75.
QMS
UltraScript .... 115.
UltraScript Plus .... 259.
Software Innovations
HandOff II .... 50.
SuperMac
DiskFit 1.5 or SuperSpool 5.0 ...... ea. 58.
Sentinel 2.2 .... 87.
SuperLaserSpool 2.0 (single user) .... 87.
Super LaserSpool (5-pack) .... 289.
Symantec Corporation
SUM II .... 99.
Tactic Software
FontShare 2.0 .... 149.
Icon-It 2.0 .... 45.

SE Radiation Shield (Kensington)
The perfect solution to a glaring problem. This high quality filter reduces the glare reflected from your Macintosh SE screen by 96%, and improves your screen contrast and clarity up to 20 times! Made of optical quality glass with ceramic anti-reflection and scratch-resistant coatings, the Anti-Glare Filter slips right onto the front of your Macintosh for a "light-tight"fit. It even filters out VLF and ELF radiation and dissipates static. And its scratch resistant coating assures years of satisfaction. (accessories) **$54.**

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AN
INSIDE
LOOK
AT
SCANNERS

MacUser Labs tests them all: flatbed scanners, sheetfed scanners, overhead scanners, hand-held scanners, and slide scanners. A picture's worth not only a thousand words but a few megabytes as well.

●

**BY
OWEN W.
LINZMAYER**

Scanners come in a myriad of shapes, sizes, and prices. For a few hundred dollars, you can hold one in your hand. For thousands more, you can commandeer a good-sized table. But all scanners are built for the same purpose: to convert any image — a photograph, line art, text, your company's logo — into a graphics file, grist for your Mac masterpiece mill. Once you've scanned an image, you can enhance it with a painting or drawing program, render the text with an OCR package, or zap off a copy with a fax modem.

To help you pick both the perfect type of scanner and the precise model for your particular needs, we surveyed the entire realm of Macintosh scanners and submitted each to months of rigorous testing under a variety of real-world circumstances. Our first report takes an in-depth look at 23 of the most popular scanners — monochrome, gray-scale, and color models. Fifteen of these are flatbed scanners, on which you place a flat document to be

scanned, much as you would with a copy machine. Five are sheetfed scanners, which pull in your document, much as a fax machine does. We also looked at three overhead scanners, which move a small overhead tower containing the optical mechanism over the image being scanned.

But our scanner coverage doesn't stop with these 23. We also took a brief look at video digitizers, which create graphics files from standard camcorders, VCRs, and laserdisc players.

And following this first comprehensive overview are two more lab reports: one on three slide scanners and another that examines four handheld scanners.

The Scanner for You

Each scanner technology has its own pros and cons. As you'll see, the best scanner for desktop-publishing purposes may not necessarily be good for optical character recognition. For example, precise alignment and detailed resolution are more important when you're scanning line art than when you're working with continuous-tone images. Jagged edges, noticeable on curves and lines, can be buried in the details of a shadowy halftone. Conversely, if you scan a continuous-tone photograph in line-art mode, you'll lose all the shading detail. Light-gray areas become white and dark grays black. The resulting

How It Works: Monochrome and Gray-Scale Scanners

Original image

Light source

Focusing lens

Reflected light bounces off the image, through the focusing lens, and into the CCD.

CCD (scan head)

The different light intensities entering the CCD produce varying voltages, which are sent to the analog-to-digital converter.

Analog to digital

The various voltages from the CCD are converted into 1s and 0s, which the computer uses to produce different shades.

8-bit

4-bit

1-bit

The digital information for that line goes to the computer.

scan resembles a photocopy of the original.

To decide which scanner type best suits your intended use, ask yourself some questions: What types of originals am I going to scan? If you need to scan small or delicate pieces of paper, forget sheetfed scanners. How often will I scan? If you have high-volume requirements, consider a scanner that can automatically feed a stack of documents. How will I output my scans? If you're going to use your scans in a HyperCard stack instead of printing them in a newsletter, you don't need a high-resolution scanner. To start you off on the road to the perfect scanner, here's a summary of the types of scanners that are available:

Flatbed scanners. If you've used a photocopier, you understand the basics of flatbed scanning. Lift up the lid, place your original image facedown on the glass, and begin your scan. A motorized scan head moves underneath the length of the glass bed and analyzes the image one line at a time.

Although flatbed models are used primarily for capturing gray-scale and color photographs, they can accept virtually anything that lies flat on the bed, from doodle-covered napkins to bound books.

This flexibility isn't without its disadvantages, though. If you're scanning stacks of paper, manually swapping originals soon becomes tiresome. For high-volume tasks, look for an optional automatic document feeder or consider a sheetfed scanner.

Sheetfed scanners. You place your document in a feeder bin, and rollers pull it past a stationary scan head — just as with a fax machine. The problem with this approach is that originals can easily become misaligned, resulting in poor scans and even paper jams. Also, the thickness and size of originals are limited. You can't stuff a book through the rollers, and small pieces can get stuck.

Sheetfed scanners typically come with automatic document feeders that hold many sheets of paper, so they are very popular for unattended OCR work. Because of alignment problems and limited gray-scale capabilities, sheetfed scanners can handle only relatively undemanding graphics tasks such as acquiring low-resolution images.

Overhead scanners. Overhead scanners (sometimes called copyboard scanners) look like miniature stat cameras. Place your original faceup on the scanning bed, and a small overhead tower containing the optical mechanism slowly passes over it, scanning the image.

In addition to being able to deal with loose sheets of paper of almost any size, overhead scanners can handle bound books and three-dimensional objects, depending on their depth of field, although focusing can be a problem. And because of the "open air" design of overhead scanners, obtaining even illumination can be difficult.

Hand-held scanners. Hand-held scanners are like mice with eyes. You roll them over your original, and the digital information runs down the tail and into your Mac. Because they are so small, hand-held scanners are portable and convenient. They are commonly used to scoop up logos, signatures, and small pieces of line art. What's more, they can scan anything within reach — including a brick wall if you want an interesting texture map for your 3-D-modeling program.

The major attraction of hand-held scanners is their low price. Some disadvantages include limited scanning area (usually a swath no wider than 5 inches) and alignment problems that come from using the human hand to control the scan.

Slide scanners. Slide scanners are like self-contained 35mm slide projectors and screens, with the projector pointing inward at a small screen array of tiny photodetectors. As light passes through a photographic transparency and strikes the photodetectors, the image is translated into thousands of pixels.

Because 35mm slides are continuous-tone images, the resulting scans are high-resolution, with excellent color fidelity and saturation. Slide scanners are better than flatbed scanners for color photographs because they have higher resolution and work with illuminated, rather than reflected, light. The drawback is that slide scanners are typically more expensive and slower than traditional scanners — and, of course, they work only on slides.

Clockwise from the left: the Varityper 1200, Microtek MSF-300GS, HP ScanJet Plus, Agfa Focus II 800GSE, and the Abaton 8-Bit Apple Upgrade

Desktop Scanners
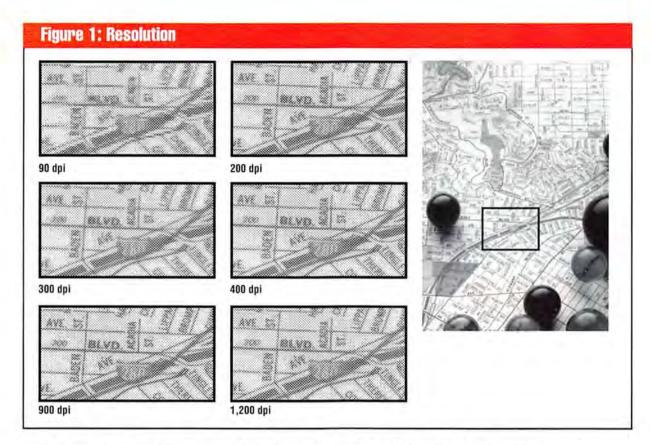
Flatbed, overhead, and sheetfed scanners are the workhorses of the image-capture world.

●

BY
OWEN W. LINZMAYER
AND THE MACUSER LABS
STAFF

Thanks to falling prices and increasing flexibility, scanners are popping up on desktops everywhere. Monochrome, gray-scale, or color images; text, line art, or photographs; loose, bound, or odd-sized paper; even small three-dimensional objects — you name it, there's a desktop scanner that can handle it.

To help you sort through the bewildering array of choices, MacUser Labs subjected 15 flatbed scanners — 11 gray-scale and 4 color — and 3 overhead scanners to a grueling set of benchmark tests. We judged each on its speed, resolvability, halftone quality, gray scale, color range, text-extraction capabilities, and ease of use. In addition to examining the flatbed and overhead models, we also looked at 4 sheetfed scanners and the unique Thunderware ThunderScan to

Figure 1: Resolution

90 dpi

200 dpi

300 dpi

400 dpi

900 dpi

1,200 dpi

Figure 1: The resolution (dots per inch) of a scanner determines how much detail it can pick up. In general, the higher the resolution, the sharper the image it can produce. Notice that the 1,200-dpi example contains less detail than the 900-dpi example, although it appears smoother. The 1,200-dpi image was produced by *interpolating* a 400-dpi image. Interpolation is a software technique that averages an image's gray-scale values and places new pixels between the existing ones.

see how well these specialists perform. In general we found that gray-scale technology has really come into its own over the last few years while color capabilities are still maturing.

Of the three types of desktop scanners — flatbed, overhead, and sheetfed — flatbed scanners command the largest market share. They've earned their position because of their versatility, image quality, and ease of use. If you're interested in introducing your Mac to the world of images, you should first consider a flatbed scanner. Although overhead and sheetfed scanners each have their own special abilities, odds are that a flatbed scanner will best meet your needs.

Do You Really Want to Do This?

Let's set something straight right away. Flatbed scanners aren't exactly inexpensive. At $995, the portable Sharp JX-100 marks the low end of the scale (and it's actually a crossbreeding of a hand-held scanner and

a flatbed) — you can get a used Mac for that kind of cash. At the other end of the spectrum is the $29,000 Varityper 1200 — you can get a brand-new Porsche for *that* kind of money! (Lest you think the Varityper overpriced, keep in mind that it comes as part of a complete system with an 8-megabyte Mac IIcx, a 210-megabyte hard-disk drive, and a Radius 19-inch gray-scale monitor.) The middle ground between these two extremes is the standard gray-scale scanner, which starts at around $1,600.

But your spending spree won't stop once you've selected a scanner. To take full advantage of the images your scanner can produce, you'll want to add a host of other peripherals to your Mac system. Detailed graphic images require a gray-scale or color monitor and a video board for display, scads of system RAM for manipulation, a huge hard-disk drive for storage, and a high-resolution printer or film recorder for output. And when you tack on the cost of specialized

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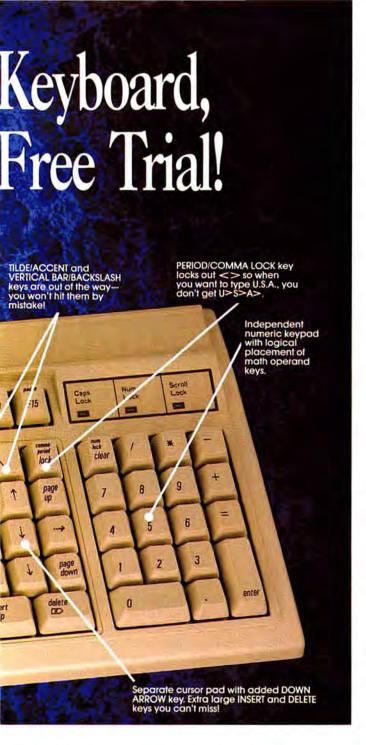
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Clockwise from the upper left: the UMAX UG80, Datacopy Model 830, DEST PC Scan 3000, Pentax SB-A4301, Apple Scanner, and Abaton Scan 300/GS

software packages for image editing or OCR (optical character recognition), the total investment rivals the annual city budget of Fargo, North Dakota.

If pondering such purchases makes your wallet whimper, consider some of the alternatives to flatbed scanners. Hand-held scanners cost hundreds, not thousands, of dollars (see "Hand-Held Scanners" elsewhere in our scanner coverage). Likewise, there are some bargains to be found in overhead scanners and video digitizers (see the "Overhead Scanners" and "Video Digitizers" sidebars). And finally, don't forget about good old clip art. There's a wealth of free electronic images in the public domain and an abundance of commercial packages from vendors such as 3G Graphics, T/Maker, and Dubl-Click.

Paper Route

If you do decide to invest in a scanner, your choice is determined largely by what you plan to scan. Think about the type and quantity of material you'll be scanning. With the exception of the portable Sharp JX-100, all flatbed scanners can process an entire letter-sized (8.5 x 11-inch) original in one pass. If you want to scan legal-sized (8.5 x 14-inch) documents, your options narrow to five flatbeds: the Abaton Scan 300/GS, Apple Scanner, Microtek MSF-300GS, Microtek MSF-300Z, and UMAX UG80. And for those of you who think really big, the Howtek Scanmaster and the Varityper 1200 both have beds big enough for tabloid-sized (11 x 17-inch) originals.

If you have high-volume requirements, look for a scanner with either a remote-scan button or an automatic document feeder. Only the Apple Scanner offers a remote-scan button, a handy feature that lets you initiate a scan without software intervention. You operate the scanner just as you do a photocopy machine, simply

4.0 ABCDEF
Abaton 8-Bit Apple
Upgrade: 5.6

4.0 ABCDEF
Abaton Scan 300/GS:
4.0

4.0 ABCDEF
Agfa Focus II 800GSE:
7.1

4.0 ABCDEF
Apple Scanner: 4.5

4.0 ABCDEF
Chinon DS-3000: 4.0

4.0 ABCDEF
Complete PC Page
Scanner: 4.0

4.0 ABCDEF
Datacopy JetReader
220: 4.0

4.0 ABCDEF
Datacopy Model 830:
4.0

4.0 ABCDEF
DEST PC Scan 2000:
3.6

4.0 ABCDEF
DEST PC Scan 3000:
6.3

4.0 ABCDEF
Hewlett-Packard
ScanJet Plus: 4.0

4.0 ABCDEF
Howtek Scanmaster: 4.0

4.0 ABCDEF
Microtek MS-II: 4.0

4.0 ABCDEF
Microtek MSF-300GS:
5.0

4.0 ABCDEF
Microtek MSF-300Z:
5.0

4.0 ABCDEF
Mirror VS300: 4.0

4.0 ABCDEF
Pentax SB-A4301
Model 2: 4.5

4.0 ABCDEF
Sharp JX-100: 4.5

4.0 ABCDEF
Sharp JX-300: 4.0

4.0 ABCDEF
Truvel TZ-3: 11.0

4.0 ABCDEF
UMAX UG80: 6.3

4.0 ABCDEF
Varityper 1200: 8.0

Figure 2: As a rule, the higher the dpi resolution rating of a scanner, the better its *resolvability* (ability to recognize tiny details). We scanned the USDC Image System Test Target's line-pair test at the highest true resolution of each scanner in line-art mode. Our panel of judges then determined the smallest line pair that each scanner could resolve. Each scanner is listed next to the smallest resolvable line pair. The 4.0-lines-per-millimeter resolution is shown for each scanner.

Figure 3: Gray Steps and Gamma Correction

Truvel TZ-3

Sharp JX-300

Microtek MSF-300GS

Abaton 8-Bit
Apple Upgrade

Varityper 1200

UMAX UG80

Microtek MSF-300Z

Agfa Focus II 800GSE

Abaton Scan 300/GS

Howtek Scanmaster

DEST PC Scan 3000

Hewlett-Packard
ScanJet Plus

Datacopy Model 830

Sharp JX-100

Pentax SB-A4301 Model 2

Apple Scanner

Gray-scale recognition   1   37
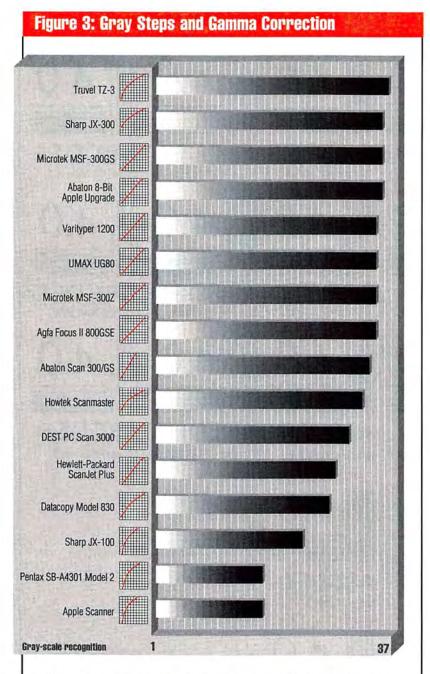
Figure 3: To test how many levels of gray each scanner could recognize, we scanned an industry-standard Kodak SR-37 test strip with 37 steps of gray, from white to black. We used Adobe Photoshop to measure the number of grays each scanner could see on the strip. The Truvel TZ-3 wins by a nose, and the Apple and Pentax scanners recognize the fewest grays.

The icons beside each bar represent the *gamma curve*, or gray-scale balance, of each scanner. An unaltered scan produces a gamma curve that is a straight 45-degree line. A scanner modifies the curve so that its scans will look best when displayed on a particular screen or printed on a certain printer. The gamma-curve correction of the Hewlett-Packard ScanJet Plus, for example, is optimized to perform best at default settings with an Apple LaserWriter.

Figure 4: Halftone Quality
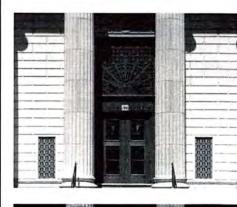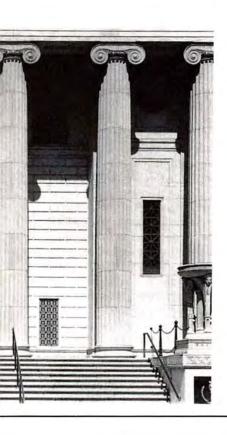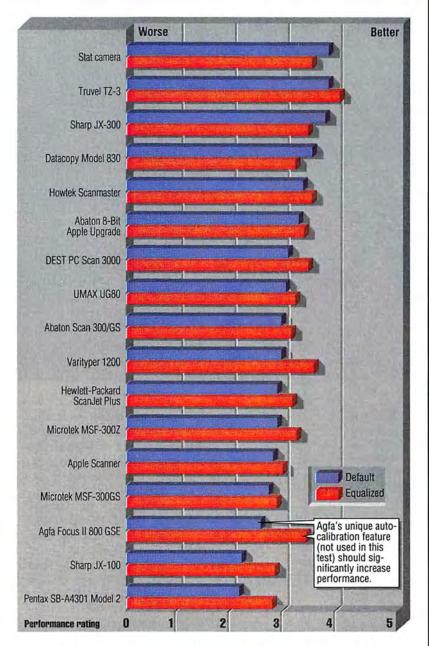
Figure 4: The quality range of halftone scans is quite wide. We scanned the photo below with our best halftone scanner, the Truvel TZ-3 overhead scanner, to get the center image. Compare that image's clarity, detail, and range of grays with the image produced by our poorest halftone performer, the Pentax SB-A4301 Model 2 (top).

Worse **Better**

Stat camera
Truvel TZ-3
Sharp JX-300
Datacopy Model 830
Howtek Scanmaster
Abaton 8-Bit Apple Upgrade
DEST PC Scan 3000
UMAX UG80
Abaton Scan-300/GS
Varityper 1200
Hewlett-Packard ScanJet Plus
Microtek MSF-300Z
Apple Scanner
Microtek MSF-300GS
Agfa Focus II 800 GSE
Sharp JX-100
Pentax SB-A4301 Model 2

Default
Equalized

Agfa's unique auto-calibration feature (not used in this test) should significantly increase performance.

Performance rating 0 1 2 3 4 5

Our jury judged 16 scanners with halftone modes on shadow detail, highlight detail, fine detail, and contrast. We scanned a black-and-white photograph at 150 dpi and then output each scan on a Linotronic L300 at 1,270 dpi with a 75-line-per-inch screen. The images were judged on a scale of 1 to 5, with 1 being abysmal and 5 being the original photograph. For comparison, we also created a traditional halftone with a stat camera.

To give some of the poorer performers a second chance, we also used Adobe Photoshop's Equalize function to spread out each scan's range of grays. This simple tweak helped the poorer performers, but it actually lessened the quality of the best scans. If it ain't broke, don't fix it.

Clockwise from the upper left, the four color flatbed scanners: the Microtek MSF-300Z, Howtek Scanmaster, Sharp JX-300, and Sharp JX-100

pressing the scan button every time you insert a new page, but you must still manually feed each document into the scanner. For unattended work, an automatic document feeder can pass a stack of documents to the scanner one at a time. Only four vendors — Datacopy, DEST, Hewlett-Packard, and UMAX — offer optional automatic feeders for their flatbed scanners, with prices ranging from $525 to $695. If you'll be processing lots of documents for OCR, you should investigate sheetfed scanners as an alternative to a flatbed model equipped with a document feeder (see the "Sheetfed Scanners" sidebar).

Getting 'Em Going

Setting up scanners is usually a straightforward process. Plug in a power cord here and a cable there, and drop a file or two into the System Folder. The Mac connection is achieved in one of four ways: straight SCSI (Small Computer System Interface) connection, SCSI with a converter box, GPIB (general-purpose interface bus) card in a NuBus slot, or connection to a serial port.

The majority of the scanners reviewed here are SCSI devices. The benefit of SCSI is that it comes with all Macs since the Plus and is faster (anywhere from 263K to 1,400K per second, depending on your Mac) than the serial port. Three scanners — the Datacopy Model 830, Hewlett-Packard ScanJet Plus, and Microtek MSF-300Z — require a special box that converts their native signals into SCSI commands. Both Datacopy and Microtek include a SCSI converter with their scanners; Hewlett-Packard charges an extra $595.

Two scanners — the Howtek Scanmaster and the Sharp JX-300 — use a National Instruments' GPIB card that plugs into a NuBus slot in any Mac II and can accept data at a rate of up to 600K per second. GPIB comes from the laboratory-instrumentation

Table 1: File Sizes

Bits per pixel	1	4	6	8	24
Image type	line-art	gray-scale	gray-scale	gray-scale or color	color
Shades of gray or colors	1	16	64	256	16,777,216
4-x-5-inch image (megabytes)	.2 MB	.9 MB	1.3 MB	1.8 MB	5.3 MB
8.5-x-11-inch image (megabytes)	1.0 MB	4.1 MB	6.2 MB	8.2 MB	24.7 MB

world, so if you experience any installation problems (as our technicians did during testing), be prepared to deal with cryptic error messages and obtuse documentation. Howtek bundles a GPIB with its Scanmaster; Sharp makes it a $570 option.

Finally, the diminutive Sharp JX-100 flatbed scanner plugs into either the modem port or the printer port. Perhaps Sharp took the serial route because a SCSI controller would have added bulk to this portable unit. The trade-off is that the serial ports are relatively lethargic (5.7K per second) and that an A-B switch box is necessary if your ports are already in use.

RAM Gluttons

In addition to considering various interfaces, you must be mindful of memory needs. Even though most scanner vendors claim that you can get away with a minimum of 1 or 2 megabytes of RAM, you'll probably

need more to display and edit your images.

The larger the image and the more grays or colors, the higher your memory requirements climb. For example, an 8.5-x-11-inch image scanned at 300 dpi with 256 gray levels gobbles up nearly 8.5 megabytes. And 24-bit-color scanners have even more voracious memory appetites (see Table 1).

Luckily, most scanners save files to disk as they scan. Therefore, you can scan as large an image as you like, provided your hard disk has enough free space to hold the resulting file. On the other hand, the Pentax SB-A4301 Model 2 and both Sharp flatbeds (as well as the Truvel TZ-3 overhead) scan to RAM only. If the image you want can't fit into RAM, too bad. Even Virtual from Connectix, which should fool the system into seeing free hard-disk space as normal memory, doesn't let you get around this frustrating limitation. This

Table 1: Color and gray-scale files grow in proportion to the size of the image and the *pixel depth* (the number of bits assigned to each pixel to define its color or gray level). We've computed file sizes (in megabytes) for 300-dpi images saved in uncompressed TIFF format.

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serious shortcoming dropped these scanners down a notch in our ratings.

Time Trials

Although we made a point of mentioning the relative speeds of the various interfaces employed, the time spent acquiring an image is negligible when compared with the amount of postscan time necessary to clean it up.

Our test system consisted of a Mac IIcx with 8 megabytes of RAM and a 44-megabyte Bernoulli Box II 44 drive running System 6.0.4. To measure speed, we scanned identical images at each scanner's maximum resolution, using various pixel depths (pixel depth is the number of bits assigned to each pixel to define its color or gray level). In general, the larger the image and the more bits per pixel, the longer it takes to scan. For a 1-bit scan of an 8.5-x-11-inch document, the H-P ScanJet Plus was the fastest at 20 seconds and the Howtek Scanmaster was the slowest at just under 3 minutes.

Resolution

The detail a scanner can discern depends largely on its *resolution*, the number of discrete pixels, or picture elements, a scanner can see in a given area. Resolution is most commonly given as dpi (dots — or pixels — per inch). In general, the higher the resolution, the better the scanner is at picking up detail such as tiny type and

Overhead Scanners

One scanning option you don't hear much about is the overhead, or copy-board, scanner. Although they're as flexible and useful as flatbed scanners, overhead scanners are more cumbersome and can suffer from illumination problems. Items to be scanned are placed faceup on an "open air" bed and are scanned by an optical mechanism, similar to a camera, that passes overhead on a small tower. Overhead scanners can handle loose sheets of paper any size smaller than the scanning bed, as well as bound books and low-profile three-dimensional objects.

MacUser Labs tested three overhead scanners — the Chinon DS-3000, the Mirror VS300, and the Truvel TZ-3. The Truvel TZ-3 tied with the Agfa Focus II 800GSE flatbed scanner for the highest rating of all the scanners we tested. It can handle documents as large as 12 x 17 inches at up to 8 bits per pixel. Thanks to its adjustable zoom lens, the resolution of the Truvel TZ-3 can be set at 75 to 900 dpi, in one-dot increments. The higher the resolution specified, the smaller the image you can scan. Nonetheless, if it's resolution you want, the Truvel TZ-3 wins hands 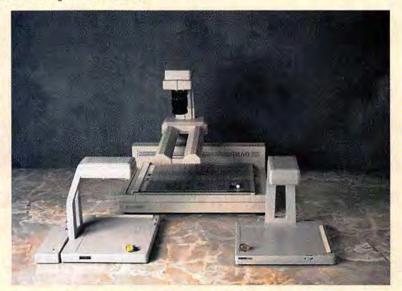down. It was capable of resolving 11 line pairs per millimeter, and with its optional ($1,795) Zebra enhancement board installed, the Truvel was able to resolve 14 line pairs per millimeter! That's really, *really* small.

Resolution isn't the only area in which the Truvel TZ-3 blew the cover off flatbed scanners. Our five-person jury rated the halftone output of the Truvel better than that of any of the flatbed scanners as well as the other two overhead scanners. It was also tops in the SR-37 test, able to differentiate among 35 of the 37 grays on the strip. On the negative side, the Truvel TZ-3 was one of the worst in evenness of illumination, despite built-in fluorescent lights. Furthermore, it can scan only to RAM, thereby limiting the size of the images you can acquire.
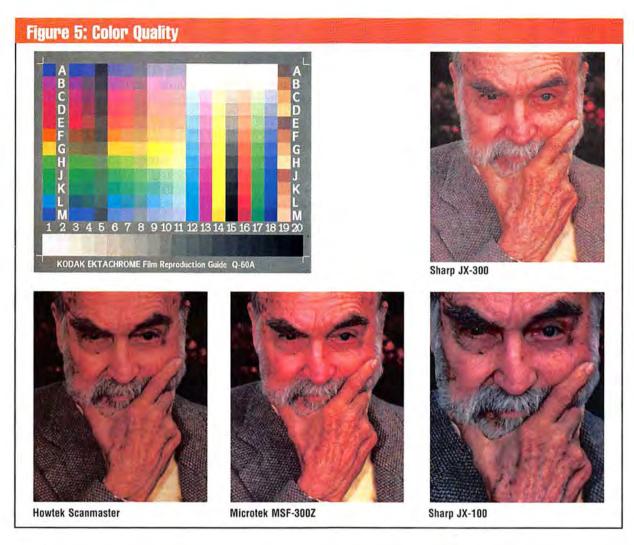
If the Truvel's lofty price tag scares you off, consider one of the less expensive overhead scanner units — the Chinon DS-3000 or the Mirror VS300. These 300-dpi monochrome scanners are identical — each uses a Chinon engine — except that the Chinon DS-3000 comes standard with a SCSI-converter box that is a $197 Mirror option. Without the box, the scanners connect to one of the Macintosh's two RS-422 serial ports and are considerably slower than SCSI-equipped units.

Both units rely on ambient light to illuminate originals lying in their 8.5-x-11-inch beds, so contrast tends to be uneven. Although it's a bit pricier than the Chinon DS-3000, the Mirror VS300 does come with a one-year warranty (compared with the Chinon's 90 days) and includes Olduvai's Read-it! OCR package ($495) and Zedcor's DeskPaint ($99).

Both the Chinon DS-3000 and the Mirror VS300 ranked among the poorest flatbed scanners in the resolution test, resolving only four line pairs per millimeter; nonetheless, they performed admirably in the OCR tests. Although they're not great, they are inexpensive, so if you're looking for a cost-effective way to scan line art and text, the Chinon DS-3000 and the Mirror VS300 deserve your attention.

From left to right, the overhead scanners: the Chinon DS-3000, Mirror VS300, and Truvel TZ-3

Figure 5: Color Quality

KODAK EKTACHROME Film Reproduction Guide Q-60A

Sharp JX-300

Howtek Scanmaster

Microtek MSF-300Z

Sharp JX-100

fine lines. High resolution is especially necessary if you work primarily with detailed line art such as engineering and architectural drawings. That's because the jaggies are most noticeable on fine lines. The drawback of high-resolution scanners is that they may pick up unwanted detail, such as dust and scratches on your originals.

Although it's easy to be tempted by scanners that boast lofty resolution rates, the resolution of most laser printers (300 dpi) is plenty for most scanning needs. With three exceptions — the Sharp JX-100 (200 dpi) and the Agfa Focus II 800GSE and Varityper 1200 (both 400 dpi) — all the flatbed scanners evaluated here have a maximum resolution of 300

dpi. (If you need even greater resolution, check out the 900-dpi Truvel TZ-3, discussed in the "Overhead Scanners" sidebar.)

Using a technique called *interpolation*, or supersampling, some scanners can give you resolutions higher than their stated maximum. The circuitry averages an image's gray-scale values and places new pixels between the existing ones. Interpolation doesn't add detail to a scan; it merely performs a smoothing function, providing better transitions between grays and reducing the jaggies (see Figure 1). Four of the scanners provide interpolation capabilities: the Agfa Focus II 800GSE (up to 800 dpi), the DEST PC Scan 3000 (600 dpi), the HP ScanJet Plus (600 dpi),

Figure 5: We used the Kodak Ektacolor Plus Paper Reproduction Guide Q-60C, which contains a broad range of color samples, to test the sensitivity and accuracy of the color scanners. Of the four color scanners, the inexpensive Sharp JX-100 had the poorest accuracy; the other three were equal, with good performances.

To judge color quality, we scanned the photo into each of the color scanners and output 2,540-dpi Compugraphic 9600 film, which was then converted into Fuji match prints (test sheets). The Sharp JX-300 had the best overall look. The Howtek Scanmaster was a bit dark, but this problem can be corrected with the scanning software provided by Howtek. The extra redness of the Microtek MSF-300Z and Sharp JX-100 is more difficult to fix.

and the Varityper 1200 (1,200 dpi).

To test resolvability — how well scanners pick up details — we scanned the USDC Image System Test Target in line-art mode at the highest true resolution of each scanner (see Figure 2). (This test sheet, which is available from the Patent and Trademark Office, contains a series of shapes and line pairs, and text of varying sizes.) We then printed the scans at 800 percent on a Laser-Writer and examined them for the

smallest line pair in which our panel of judges could resolve at least two contiguous pairs of lines both vertically and horizontally.

It should come as no surprise that the 400-dpi scanners fared better than the 300-dpi units. The Varityper 1200 did the best, being able to resolve 8.0 line pairs per millimeter. Of the 300-dpi scanners, the DEST PC Scan 3000 and the UMAX UG80 had the sharpest images. Worthy of note is that the inexpensive 200-dpi Sharp JX-100

did better than almost half of the 300-dpi scanners.

Made in the Shade

The number of grays a scanner can see depends on the amount of internal memory it devotes to each pixel (see the "How It Works: Monochrome and Gray-Scale Scanners" sidebar). Early monochrome scanners saw everything in black-and-white, because they used only 1 bit per pixel. To simulate grays, monochrome

Sheetfed Scanners

Scanner Jeopardy: The answer is *sheetfed scanner.* The question: What's a fast, low-cost device used mostly for OCR and fax scanning? As long as quality isn't your main concern, a sheetfed scanner can also input line-art and even gray-scale images. But before you're stuck with an expensive doorstop, you'll need to answer some more questions: Are your sheets mostly standard- or legal-sized? Are they standard weight, very thin, or very thick? Do you want to scan single sheets or load a tray and let the scanner run unattended?

The implications of these questions became clear when we looked at the features and limitations of four sheetfed scanners and one variation on the theme. The resolution was fairly consistent, at a respectable four line pairs per millimeter at 300 dpi — features of sheetfed scanners vary more than performance.

The DEST PC Scan 2000 has a horizontal, single-sheet input tray, but the optional multisheet feeder can handle 35 sheets. The paper path makes a 180-degree turn, so watch out for extra-thick sheets or photographs. Small 3-x-3-inch sheets scan without mishap, but nothing wider than 8.5 inches can fit — a limitation that barred entry to our resolution test sheet, which was 8.8 inches wide. Maximum resolution is 300 dpi, and 16 levels of gray are available in addition to line-art and halftone settings.

The Complete PC Page Scanner also has a paper tray with a single-sheet limitation, and again the tray was too narrow for our resolution test sheet. The paper path is relatively straight, and 3-x-3-inch sheets are no problem. Only line art and halftones are possible, at up to 300-dpi true resolution (400-dpi interpolated).
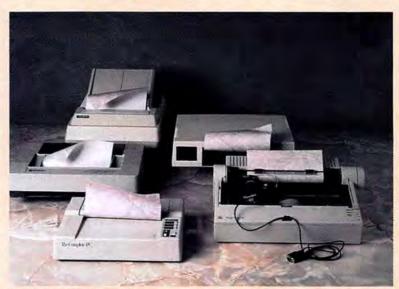
The Datacopy JetReader 220 has a fairly straight paper path and a paper tray wide enough for our resolution test sheet, and it accepts a 10-sheet tray. The 3-x-3-inch sheet lost its way inside the scanner and had to be removed manually. You can select line art, halftone, or 16 levels of gray — at a maximum resolution of 300 dpi.

The Microtek MS-II has a rated capacity of 50 sheets, and our test trays never jammed. The paper path is short and straight and easily handles 3-x-3-inch

sheets. The glossy surface of our resolution test sheet was too slippery for the MS-II's paper-feed mechanism, however, resulting in distortion of output images. Only line-art and halftone settings are supported — at up to 300 dpi — and TIFF, PICT, and EPS formats are available.

Although it's not strictly a sheetfed scanner, we couldn't ignore the ingenious Thunderware ThunderScan. This low-cost scanning alternative is simply a scanning head that mounts over the print head of your ImageWriter or ImageWriter II. It's cute but agonizingly slow: A single-sheet scan can take up to 20 minutes, versus 15 to 30 seconds with the other four sheetfed scanners. Thick sheets are susceptible to scratches from the scanning head, and glossy sheets do not scan well. A maximum resolution of 288 dpi and 32 gray levels are featured, and TIFF, PICT, EPS, and paint output formats are supported. The basic setup is only $249, but you need a $49 Power Accessory if your Mac belongs to the Mac II family. Thunderware, Inc., 21 Orinda Way, Orinda, CA 94563; (415) 254-6581.

— John E. Price

From left to right, the sheetfed scanners: the Complete PC Page Scanner, Datacopy JetReader 220, DEST PC Scan 2000, Microtek MS-II, and Thunderware ThunderScan

scanners (and all scanners in 1-bit mode) employ a trick called dithering, which combines adjacent black and white pixels into patterns that look like photographic halftones.

The advantages of scanning photographs in the black-and-white halftone mode are that the resulting file is much smaller than a gray-scale scan and that it prints much faster, since the printer needn't convert gray scale to halftone. The disadvantage is that the image is locked at the scan resolution and is therefore nearly impossible to edit or resize. For maximum editing flexibility, scanning in true gray-scale mode is best.

All 15 flatbed scanners reviewed here can capture real grays, because they use more than 1 bit to define each pixel. A 1-bit pixel can define two shades: black and white. The more bits per pixel, the more shades of gray and the more realistic your scan. The Apple Scanner and Pentax SB-A4301 Model 2 store 4 bits per pixel; thus, a pixel can be one of 16 shades of gray. Likewise, the 6-bit Datacopy Model 830 can see 64 gray levels. All the others are 8-bit scanners and can generate the full range of 256 gray levels.

We knew that the Apple Scanner was a 4-bit unit, so we were surprised to learn that it contains a Tokyo Electronic Company engine that can register 8 bits of gray. Apple Scanner owners who want 256 gray levels should buy Abaton's 8-Bit Apple Upgrade ($595). Once it's installed by a field technician, this kit essentially turns the Apple Scanner into an Abaton Scan 300/GS. (If you don't already have an Apple Scanner, it's more cost-effective to buy the Abaton Scan 300/GS). We evaluated the Apple Scanner with and without the Abaton 8-Bit Apple Upgrade.

To test how well each scanner was able to distinguish among various levels of gray, we scanned an industry-standard Kodak SR-37 test strip with 37 steps of gray, from white to black. The resulting files were imported into Adobe Photoshop to measure the number of grays each

Figure 6: Color Saturation

Figure 6: Gamma correction — the adjustment of color balance — improves color saturation. This adjustment is usually done in software, but Truvel does it automatically in hardware. The image at the top is the original photograph. The next image is the default scan from the Sharp scanner, and the one at the bottom is the gamma-corrected image.

scanner differentiated on the strip.

As expected, the 4-bit units — the Apple Scanner and the Pentax SB-A4301 Model 2 — came in in last place, recognizing only 16 different grays from among the 37 blocks — the best you can expect of a 4-bit scanner. Theoretically, the 8-bit scanners can distinguish among 256 levels of gray, so they should have no problem handling a lowly 37, right? Wrong.

The best of the 8-bit scanners — the Apple Scanner with Abaton 8-Bit Apple Upgrade, the Microtek MSF-300GS, and the Sharp JX-300 — could sense only 34 of the 37 gray levels (see Figure 3). What's going on? We've stumbled onto one of the little white lies of scanners. Because

"noise" creeps into images, 8-bit scanners offer only approximately 6 bits of accuracy. Don't get us wrong; they all *try* to give you 256 grays, but those grays aren't really accurate.

For a real-world evaluation of each scanner's gray-scale ability, we used its greatest pixel depth at 150 dpi to scan a test image of a street scene. These files were then printed on a Linotronic L300 at 1,270 dpi for our judges to examine for smooth shading, detail in shadows and highlights, realistic contrast, and focus (see Figure 4). The Truvel TZ-3 overhead and Sharp JX-300 flatbed received the highest ratings from our panel; the Pentax SB-A4301 Model 2 and the Sharp JX-100 turned in the poorest performances.

Capturing Color

Color has been slow to catch on in the scanner market, because — until recently — there have been few color applications to drive demand. Most scanners are purchased for desktop publishing, where most work is done in black-and-white. But if you're active in the emerging fields of multimedia or desktop presentations, you know the importance of color and the impact it can make. For you, there are four flatbed scanners to choose from: the Howtek Scanmaster, the Microtek MSF-300Z, and the Sharp JX-100 and JX-300. Of the four, the Sharp JX-100 has the smallest color range, with 6 bits per color. Since there are three primary colors for each pixel, this translates into 18 bits

Video Digitizers
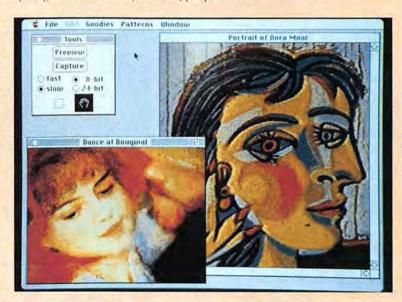
Scanners are great for getting images from paper to screen, but they fall flat when you want a picture of a skyscraper. To capture real-world three-dimensional images, you need a video digitizer. Video digitizers create graphics files from standard video sources including camcorders, VCRs, still-video cameras, and laserdisc players.

Video digitizers open up interesting new input avenues, but their resolution and color quality are limited by a video source that can't compete with print or film. Most can capture an entire video frame in as little as 1/30 second. Digital Vision sacrificed speed for economy when it created ComputerEyes Color ($450), the lowest-priced 24-bit video digitizer for the Mac II family. Unlike frame-grabbing digitizers that essentially take video snapshots, ComputerEyes takes six seconds to capture a 640-x-480-pixel 24-bit-color image from a static source. Its NuBus card has an RCA-type phono jack for common NTSC (National Television Standards Committee) signals and a 4-pin mini-DIN connector for S-video devices such as Super VHS and Hi-Band 8mm recorders. A similar monochrome model for compact Macs, ComputerEyes B/W ($250), plugs into the RS-422 serial port and captures 8-bit-gray-scale images. Digital Vision, 270 Bridge St., Dedham, MA 02026; (800) 346-0090 or (617) 329-5400.

Koala Technologies' MacVision ($499) has recently received an upgrade. One of the first Mac video digitizers, MacVision accepts both NTSC and PAL (phase-alternating line — the European video standard) signals. Because it connects to the serial port, it is somewhat slow, but it can create 8-bit images of up to 640 x 480 pixels. The upgraded MacVision comes with improved

image-editing software. Koala Technologies, 70 N. 2nd St., San Jose, CA 95113; (408) 287-6311.

The Aapps MicroTV ($395) is a black-and-white television on a NuBus card that displays real-time video in a Mac II window (see review, May '90, page 54). A tap of the space bar copies any MicroTV frame into the Clipboard as a 256-x-216-pixel PICT2 image with 128 gray levels. The MicroTV Professional model ($595) can display and capture images four times larger, and a color model is in the works. Aapps, 756 N. Pastoria Ave., Sunnyvale, CA 94086; (408) 735-8550.

These two images were digitized using Digital Vision's ComputerEyes and a video camera on a tripod.

Do you long for a greater range of grays or colors? New advanced scanners are just around the corner, but they won't be cheap.

At the high end, Sharp Electronics has just started shipping the JX-600 Commercial Color Scanner ($14,995), featuring resolution of up to 600 dpi and an image area of up to 11 x 17 inches. This flatbed scanner samples data at 10 bits per color for true 8-bit-per-color accuracy (16.8 million total colors). Included with the scanner is an adapter that lets you scan transparencies of up to 11 x 16.5 inches.

Howtek has introduced the Scanmaster 3, a high-performance flatbed color scanner costing less than $10,000. It should be available by the time you read this. Unlike the original Scanmaster, which uses the Sharp JX-450 engine, this 400-dpi scanner uses a Howtek proprietary engine. The Scanmaster 3 has a scan area of up to 11.7 x 17 inches. Rather than oversampling the data at 10 bits per pixel as the Sharp JS-600 does, Howtek claims full 8-bit-per-color accuracy.

UMAX will soon ship an 8.5-x-11-inch, 24-bit-color scanner with an internal SCSI interface for less than $2,500. It will use a three-pass, RGB-filtered 300-dpi engine developed by UMAX.

Ricoh's plans include the FS1 S, a 400-dpi, 24-bit scanner. It uses a three-pass, RGB CCD array with a beam-splitter prism that makes a real screamer of a one-pass engine. With claimed accuracy of 7 bits per color, this 8.5-x-11-inch flatbed should retail for less than $6,000. Ricoh Corp., Peripheral Products Division, 3001 Orchard Parkway, San Jose, CA 95134; (408) 954-5369.
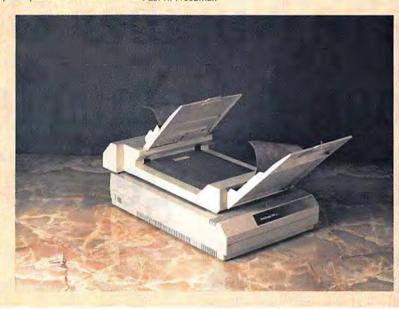
The new Mitsubishi SC-7500 Color Scanner is a 400-dpi, 24-bit flatbed scanner. This $8,950 unit can scan an area of up to 11 x 17 inches. Mitsubishi International Corp., Information Systems & Services Division, Computer Graphics Dept., 701 Westchester Ave., White Plains, NY 10604; (914) 997-4999.

Also just released is LaCie's 24-bit-color SilverScanner ($1,499), which scans at 300 dpi in one pass and interpolates at 50 to 600 dpi. LaCie, 19552 S.W. 90th Court, Tualatin, OR 97062; (800) 999-0143 or (503) 691-0771.

If you don't need color, you might be interested in the Datacopy GS Plus ($2,195),

an 8-bit gray-scale scanner that should ship by the time you read this. Intended to replace the Datacopy 730GS, this flatbed will sport a larger (8.5 x 14-inch) scan bed, as well as an internal SCSI interface. An optional FIFO document feeder that holds up to 50 sheets will be available for $595. Xerox Imaging Systems will be bundling this scanner with software (MacImage); a new scan DA, ImageCopy, that will scan directly to the Clipboard; and all the necessary cables. Xerox claims that this scanner has the fastest gray-scale scan times available. Xerox Imaging Systems (DEST), 1015 E. Brokaw, San Jose, CA 95131; (408) 436-2700.

HSD will soon market a 300-dpi, 8.5-x-11-inch scanner that uses a UMAX-designed engine driven by the company's own custom software. This 8-bit, sub-$2,000 scanner will use new ROMs that include HSD's Gray Spectrum enhancement, which lets you make corrections to specific ranges of gray values on the original. The result is a better distribution of grays and preservation of highlight and shadow detail. HSD plans to ship this scanner by the time you read this. HSD, Inc.,1350 Pear Ave., Suite C, Mountain View, CA 94043; (415) 964-1400.

— Paul R. Freedman

per pixel. The other three color scanners are 8-bit-per-color models, each theoretically able to recognize 16,777,216 colors. However, color scanners suffer from the accuracy problems of gray-scale scanners mentioned earlier, so the color range of even the best scanners is in effect much smaller.

Actually, very little distinguishes color scanners from their gray-scale brethren. The main difference is that color scanners scan images in three passes, using colored filters (red, green, and blue) that attempt to simulate the color sensitivity of the human eye. In fact, with the $399.95 Colorset package from Studiotronics, all gray-scale scanners can produce color scans. With Colorset, you use your scanner's existing software and scan an image three times, making one pass for each of the red, green, and blue filters in the package. Once you've done this, the Colorset utility electronically combines the three

gray-scale scans into one color file. Colorset is for people who want to extend the usefulness of gray-scale scanners they already own, but its image quality can't compete with that of true color scanners, because of calibration problems, dust, and the like.

Testing the color scanners proved to be the most difficult of all the aspects of our work on this report, because there is no known method of measuring the exact color of a scanned

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image. There are too many variables: the technique used to print the original, the scanner settings, differences in monitor phosphors, and inconsistencies in printed output. These factors interact with one another to make it impossible to state that a particular scanner provides the truest color reproduction. The best we can do is compare the scanners relative to one another.

Never ones to be daunted by an impossible task, the MacUser Labs technicians devised an ingenious method of measuring each scanner's relative ability to reproduce the entire range of human color vision. First we scanned the industry-standard Kodak Ektacolor Plus Paper Reproduction Guide Q-60C (see Figure 5).

The resulting files were imported into Adobe Photoshop to give us RGB (red, green, blue) values. These values were then mathematically mapped onto a *CIE color space*, an internationally accepted method of objectively describing color. Of the four color scanners, the inexpensive Sharp JX-100 had the poorest accuracy. It had problems with oranges and saw yellows as overly dull. The other scanners all performed reasonably well.
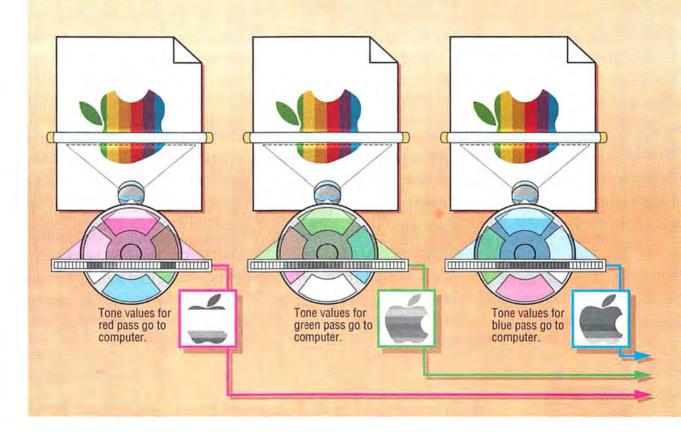
No matter what numbers and charts tell us about scanner performance, the final arbiter must be a pair of eyes. If a scan doesn't look good, nobody cares how well it scores in laboratory tests. So to give us a real-world assessment, our panel of judges

compared test images from each of the color scanners, produced by the best color-output device we had at our disposal, a 2,540-dpi Compugraphic 9600. (You can't say we didn't give each color scanner its best shot.)

The Sharp JX-300 output had the best overall look, with very realistic flesh tones (see Figure 5). The Howtek Scanmaster image was a bit dark, but that's easy to tweak. You can either raise the scanner's brightness level before scanning or use an image-editing program to increase the brightness after the fact. On the other hand, the Microtek MSF-300Z and Sharp JX-100 images were both too red. This problem isn't as easy to fix, because if you compensate for the

How It Works: Color Scanners

Color scanners work the same as monochrome and gray-scale models do — the only difference is that each line is scanned three times, once with each of three colored (red, green, and blue) filters. The firmware combines the three values into the color picture on your display. Because they are based on exactly the same technology, color scanners can do everything that gray-scale and monochrome models can do, and they can do it just as well.

Tone values for red pass go to computer.

Tone values for green pass go to computer.

Tone values for blue pass go to computer.

red by changing the scanner's gamma curve (the color response of the scanner at increasing light intensities), you invariably throw off other colors in the process (see Figure 6). Keep in mind that the relative strengths and weakness that show up in real-world tests depend on the image chosen. If we had used an image with a different range of colors, our judges might have noticed other peculiarities than those we've mentioned.

Software
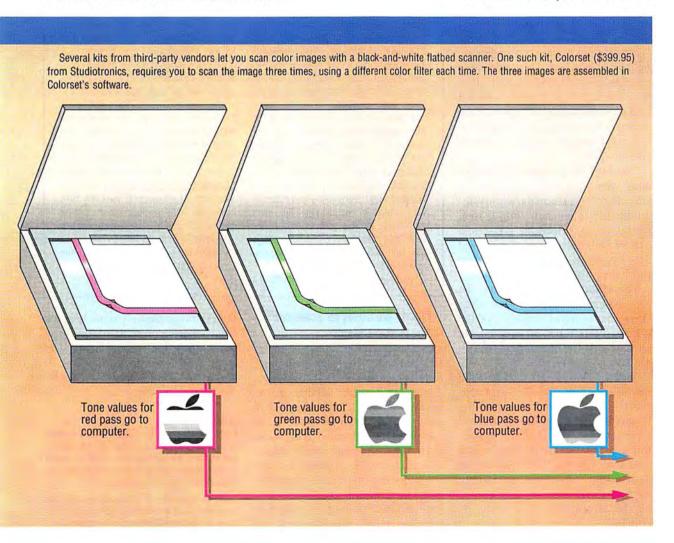
Because scanners don't have a lot of physical controls — knobs, switches, and so on — their software determines how easy they are to use. The software bundled with our tested scanners comes in three flavors: DAs,

applications, or plug-in drivers. DAs are convenient, because they can be accessed at any time, but they're usually not as full-featured as dedicated scanning applications. Plug-in drivers tell popular image-editing applications such as Digital Darkroom how to access particular scanners. Their benefit is that you can scan and edit in a single familiar application.

Scanner vendors seem to be of two minds when it comes to software. The first group simply provides the basic tools necessary to acquire scans. If the scanner you choose has this limitation, make sure the software can save in a format you can open in your favorite applications (see Table 2).

The second group goes one step further and includes software for manipulating scanned images. For instance, Abaton and Microtek throw in Letraset's ImageStudio and Silicon Beach's Digital Darkroom with their scanners, whereas UMAX and Varityper bundle only the latter. Only the Agfa Focus II 800GSE and the Pentax SB-A4301 Model 2 come without any software whatsoever, so be prepared to spend several hundred dollars on a good scanning package if you decide to buy either of these products.

Of the color scanners, the Microtek MSF-300Z comes with the least-complicated software. Its default settings provide rich, saturated scans, but there is little you can do in the

Several kits from third-party vendors let you scan color images with a black-and-white flatbed scanner. One such kit, Colorset ($399.95) from Studiotronics, requires you to scan the image three times, using a different color filter each time. The three images are assembled in Colorset's software.

Tone values for red pass go to computer.

Tone values for green pass go to computer.

Tone values for blue pass go to computer.

way of color correction — fine for laypeople who want color scans but don't require precise accuracy. The MSF-300Z does, however, include PhotoMacEdit for color correction and separations after the scan.

Graphic-arts professionals will feel at home with the software bundled with the Howtek and Sharp scanners. Though difficult to understand at first, the software provides powerful gamma, brightness, and contrast controls. If you know what you're doing and the effects you're looking for, these software packages offer a tremendous amount of flexibility.

Read My TIFFs

Aside from image acquisition for desktop-publishing work, the second most common application for scanners is OCR (optical character recognition). To test how well each scanner could read, we scanned normal, dark, light, and faxed text — representative of documents scanned in a typical office. The pages had different-colored backgrounds to test the ability of the scanners to provide an image that had good contrast under a range of conditions.

The TIFF files created by the scanners were imported into Caere's OmniPage to perform the text recognition. We timed how long it took OmniPage to convert the image to a MacWrite II document and then used the MacWrite spelling checker to count the errors in each file.

The Microtek MSF-300Z has the best recognition accuracy for white sheets but requires tweaking of the brightness control to give acceptable OCR results for brown and goldenrod sheets. On average, the UMAX UG80 and Varityper 1200 had the lowest error rates for all five colored sheets. The Howtek Scanmaster, Pentax SB-A4301 Model 2, and Agfa Focus II 800GSE all performed below average. OmniPage was able to deal with UMAX TIFF files faster than it dealt with all others and took the most time with the files produced by the error-prone Agfa Focus II 800GSE.

The Bottom Line

Singling out one best scanner from the various shapes and sizes available is like recommending a certain car for all drivers, from the farmer to the cabdriver. After testing 23 desktop scanners for speed, image quality, ease of use, and a variety of other factors, we chose 3 that best fit three different work situations.

If you need color, we recommend the **Microtek MSF-300Z** ($2,695). It's the least expensive full-sized color/gray-scale scanner, with a street price that hovers around that of many gray-scale models. Even if you don't need color right now but think you may need it in the future, you would be wise to consider coughing up a little extra cash today for this 300-dpi model. The MSF-300Z also includes an impressive software bundle — Digital Darkroom, ImageStudio, and PhotoMacEdit.

Our favorite 8-bit gray-scale-only flatbed scanner is the **Agfa Focus II 800GSE** ($6,945), a solidly built 400-dpi unit. Its high resolution may — in part — account for why it didn't fare too well in the OCR tests: It was too accurate for its own good, picking up unwanted details such as dust and specks of toner. We were also impressed with the McViewPlus II software, a $495 extra that's required to run the 800GSE. McViewPlus II is a powerful application that features automatic calibration and sophisticated image editing.

We are equally impressed by the **Truvel TZ-3** ($6,495) overhead scanner, which we recommend for those who need very high resolution. With resolution of up to 900 dpi, the ability to resolve 14 line pairs per millimeter, superior halftone output, and the ability to handle large documents, the Truvel TZ-3 is a clear choice for high-end users.

Where We Stand on Scanners

The last time MacUser Labs evaluated scanners ("Scanning the Color Horizon" and "Gray Expectations," June '89, pages 90 and 170, respectively), gray-scale scanner prices hovered around $2,000. Apple had yet to define 32-bit QuickDraw, so there were few color models to choose from. Now prices have dropped considerably, and 24-bit-color scanners are becoming more commonplace. Since there is little mechanical difference between the two, expect to see even more color scanners and fewer gray-scale-only models in the future. There are some fine products among today's offerings, but be careful, the pack also harbors a dog or two. Check "The Bottom Line" sidebar before you buy.

Three Mac slide scanners (left to right): the Nikon LS-3500, the Barneyscan CIS•3515, and the Howtek Scanmaster 35/II

Slide Scanners

The publishing industry scans more than a quarter million slides each week. We tested three scanners that introduce your Mac to this expanding market.

●

**BY
BRUCE FRASER
AND THE MACUSER LABS
STAFF**

Color on the Mac has grown from a high-end curiosity to an important element of desktop publishing, multimedia, and presentations. But despite the advent of image-manipulation programs such as Adobe Photoshop and Separator, it's still difficult — if not quite experimental — to include electronic versions of continuous-tone color photographic images in Mac-produced publications. The first step in this process, the capture of the image itself, is crucial to success.

Slide scanners, which scan 35mm photographic transparencies, are an excellent image-capture method for publication work. As source material for scanned images, transparencies have two main advantages over prints. First, they are inherently capable of a much wider range of brightness,

contrast, and color saturation than are reflective materials such as color prints. Second, slides are easier to handle, store, and transport than prints are. Taken together, these two factors have made slide scanners the device of choice for those brave souls who perform desktop color separations.
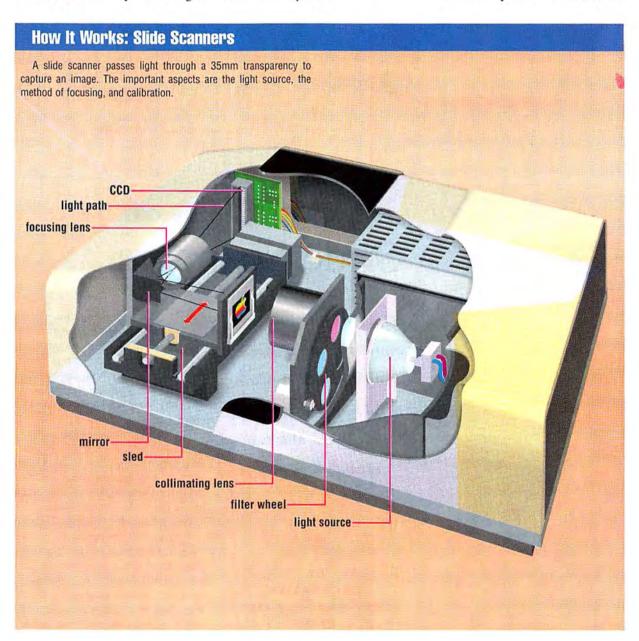
We tested three slide scanners: the Barneyscan CIS•3515, Howtek Scanmaster 35/II, and Nikon LS-3500. We also looked at prerelease versions of the Array Technologies AS-1 and Barneyscan CIS•4520 scanners (see the "On the Horizon" sidebar). Although all the scanners produce full-color 24-bit images from 35mm transparencies, we found differences in ease of setup and use, in image-processing and color-correction capabilities, in scanning speed, and in maximum resolution. After extensive testing, we recommend the Barneyscan and Nikon scanners, depending on which features you consider most important.

Setting Up

All the scanners require a Mac II with a vacant NuBus slot and at least 4 megabytes of RAM. A 24-bit video card, although not required for scanning, is almost essential for doing any manipulation of color images — the scanners' software produce an 8-bit dithered image for display on 8-bit-color monitors, but adjustments to the color quickly turn these dithered images into garbage.

The Barneyscan CIS•3515 is the

How It Works: Slide Scanners

A slide scanner passes light through a 35mm transparency to capture an image. The important aspects are the light source, the method of focusing, and calibration.

- CCD
- light path
- focusing lens
- mirror
- sled
- collimating lens
- filter wheel
- light source

easiest of the scanners to set up, since it uses a proprietary NuBus board that requires no configuring. After you cable the board to the scanner and place an INIT (which installs the scanner drivers each time you start your Mac) in the System Folder, the CIS•3515 is ready to calibrate.
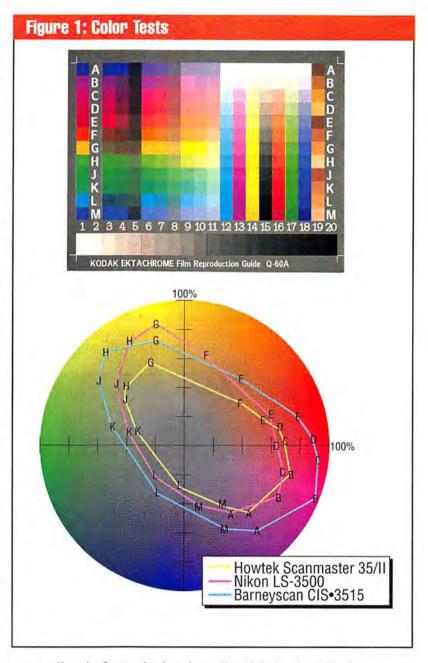
The Nikon and Howtek scanners, on the other hand, both use a GPIB (general-purpose interface bus) NuBus board (which can have several GPIB devices daisy-chained to it). Unfortunately, the application that configures the GPIB INIT for both scanners, charmingly named ibconf, borders on the user-hostile.

In the case of the Howtek scanner, the INIT was configured for an earlier model of that company's scanner, and the error message — "sp_scan_to_disk(): create() of temp file failed;; os check: os ERR error code of -48;;" —offered by ibconf was no help. The manual did not cover the topic adequately, and it took considerable experimentation to get the INIT configured properly.

The Nikon scanner came with a correctly set up INIT and a manual with clear instructions for configuring the INIT, just in case. All that was required was to install the GPIB board, plug in the scanner, and place the INIT in the System Folder.

Next, you need to calibrate the scanner. All three scanners use a linear CCD (charge-coupled device) array to record the light that passes through the transparency. The calibration process establishes values for absolute black and absolute white and compensates for minute variations in the lighting and in the response of each element in the CCD array.

Barneyscan recommends recalibrating its scanner weekly or each time you move it. The process, which takes about 15 minutes, uses a special calibration slide (supplied) and, once started, requires no user intervention. Unlike with the other scanners, you also need to focus the CIS•3515. The Focus command presents an on-screen numeric display that changes

as you adjust the focus wheel on the scanner. The image is in focus when the highest number is displayed. We found this more difficult to use than the auto-focus of the other scanners, and it didn't really seem to increase sharpness.

The Nikon scanner is self-calibrating and is ready to use as soon as it's connected to the GPIB board. Instead of using absolute values for black and white, it automatically

Figure 1: Color Tests

KODAK EKTACHROME Film Reproduction Guide Q-60A

Howtek Scanmaster 35/II
Nikon LS-3500
Barneyscan CIS•3515

Figure 1: To test the quality of scanned colors, we used a Kodak Ektachrome Q60 Color Target transparency and a photograph. The Barneyscan CIS•3515 and Nikon LS-3500 yielded color of a wider range and better quality than did the Howtek Scanmaster 35/II.

performs a routine called prescan sensitometry during the first scan of each session and uses it to match the range of tonal values in the slide being scanned. Normally, this needs to be done only once, but if a slide is very different in tonal values from others scanned in the same session, you can choose Prescan Sensitometry from a menu. Prescan sensitometry takes about ten seconds, depending on the contents of the slide.

Calibration of the Howtek for black and white values must be done each time the scanner is turned on. The process is quite simple and takes about two minutes. During calibration, however, the Scanmaster 35/II makes a sound like someone drilling through a cinder block. The Howtek scanner is quite noisy in general, but the sound made during calibration is the most extreme in its repertoire.

Previewing the Scan

All three scanners allow you to perform a quick low-resolution preview scan that you can use as a basis for adjusting exposure controls, cropping the image, and doing gamma correction (adjusting the midtone levels in an image without changing the highlights and shadows). You can also use automatic exposure and gamma settings on each scanner.

The BarneyscanXP software does the fastest preview scan, taking about 35 seconds to produce a gray-scale preview image with 256 shades of gray — it doesn't do a color preview image. You can use this image to set exposure, gamma-correction levels, and image cropping and scaling for the final scan. The effects of your adjustments are displayed interactively in the preview image.

Howtek's MacScan-It application

provides a color preview image in 1 minute 45 seconds. Exposure and gamma adjustments aren't interactive — you must do another prescan to see the effects. Cropping involves moving and resizing a transparent preview window that floats in front of the image rather than using a normal selection marquee — we found this quite clumsy. The Howtek software also lets you set the output resolution for the scan. Unfortunately, each time you choose preview, the output resolution defaults to that of the postage-stamp-sized preview image, so you must remember to reset the output resolution after performing the preview scan.

Nikon's Colorflex software has the most complete set of prescan adjustments and also gives the highest-resolution prescan image — 768 x 512 pixels. (Because slide scanners

On the Horizon

The slide scanners we tested all cost less than $10,000, but publishing professionals interested in the high end of Macintosh 35mm scanning should take a look at two new slide scanners in the $25,000 range. Both units should be available by the time you read this.
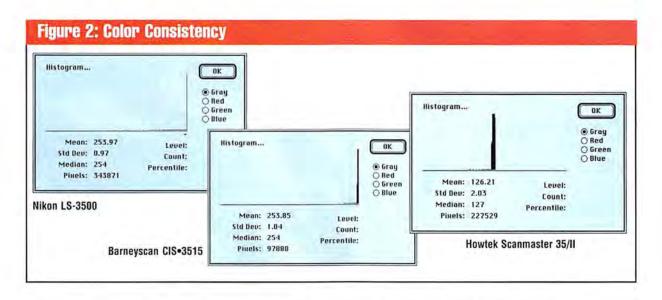
The Array Technologies AS-1 scanner is a technological departure. Whereas the scanners we tested use a linear CCD array to read the image one scan line at a time, the AS-1 uses a 256-x-256-pixel Hitachi color-TV matrix sensor. To increase resolution, the AS-1 moves the matrix subpixel distances and resamples the image. The AS-1 scanner is an integrating camera — that is, it continuously samples the image and then sums and averages the results. The longer the integration time the operator chooses, the better the color fidelity that results — simple scans can be done in two minutes and very high resolution scans in two hours. Because the camera head is detachable from the unit that holds and illuminates the slide, options such as copy stands and tripods allow you to scan not only 35mm slides but also large-format transparencies, printed material, and even 3-D objects. Array Technologies, Inc., 7730 Pardee Lane, Oakland, CA 94621; (415) 633-3000.

Barneyscan announced its new CIS•4520 just as we finished testing. The CIS•4520 will feature a maximum 2,000-x-3,000-pixel resolution with 12-bit-color accuracy and will handle transparencies up to 4 x 5 inches.

Bundled with the scanner will be Barneyscan's excellent new CIS•ColorAccess software, a sophisticated package for producing color separations that will allow selective brightness controls and contrast controls for each color and adjustable gray-balance and tone-curve settings to compensate for different types of press, ink, and paper.

Two new high-end slide scanners: the Barneyscan CIS•4520 (left) and the Array Technology AS-1

Histogram...

OK

○ Gray
○ Red
○ Green
○ Blue

Mean: 253.97   Level:
Std Dev: 0.97   Count:
Median: 254   Percentile:
Pixels: 343871

Nikon LS-3500

Histogram...

OK

⊙ Gray
○ Red
○ Green
○ Blue

Mean: 253.85   Level:
Std Dev: 1.04   Count:
Median: 254   Percentile:
Pixels: 97888

Barneyscan CIS•3515

Histogram...

OK

⊙ Gray
○ Red
○ Green
○ Blue

Mean: 126.21   Level:
Std Dev: 2.03   Count:
Median: 127   Percentile:
Pixels: 227529

Howtek Scanmaster 35/II

are designed to scan the complete area of a 35mm slide, resolution is usually given in pixels rather than in dots per inch.) But the LS-3500 has the slowest prescanning time, at 2 minutes 52 seconds, and Colorflex's powerful controls can be somewhat bewildering to novices. Fortunately, the Nikon LS-3500's automatic-exposure mode generally gives excellent results.

The LS-3500 is the only scanner tested here that lets you choose from a variety of input resolutions, which Nikon calls resolution pitches, but the method for doing so isn't particularly intuitive. Pitch settings range from 1 to 50. Resolution equals the maximum resolution of the scanner (6,144 x 4,096 pixels) divided by the pitch value. Thus the default setting, 8 pitch, results in a 768-x-512-pixel image.

Scanning the Slide
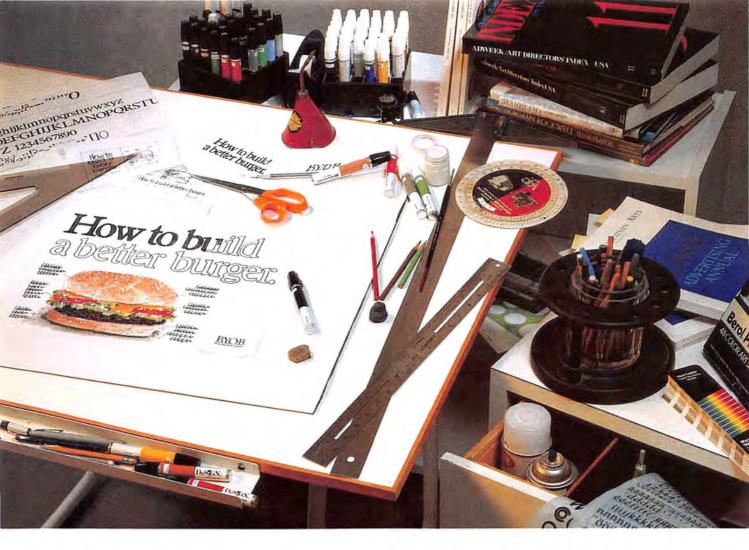
Once you have the exposure settings, cropping frame, and scaling factor set to your satisfaction, the next step is to perform a full-resolution scan and save it to disk. The Barneyscan treats scanning and saving to disk as two separate operations, but it still had the fastest raw scanning speed of the three scanners. Scanning our test image at 1,520 x 1,024 resolution took 1 minute 40 seconds, and saving to disk took an additional 9 seconds.

The Howtek also treats scanning and saving as separate operations but is by far the slowest of the three scanners. Scanning the image took a lengthy 9 minutes 41 seconds, and saving the image to disk took a further 2 minutes 13 seconds. Howtek's MacScan-It software commits the cardinal sin of failing to warn you if you quit the application with an unsaved image. It simply quits, and the image, which took so long to capture, is lost — unforgivable.

The Nikon scanner treats scanning to disk as a single operation. It also has a somewhat unusual file-handling system. When you choose Scan to Disk, Colorflex asks you to name a folder that will contain the image files. In addition to saving the final image file, the Colorflex software saves the red, green, and blue channels of the image as separate TIFF files, so a scan requires well over twice as much disk space as the actual image. To use the maximum 6,144-x-4,096-pixel resolution of the scanner, you need 145 megabytes free on your hard disk!

Our test image took 7 minutes 57 seconds for the LS-3500 to scan and save. The relatively slow speed is mitigated by two features. First, you can set the input resolution of the

Figure 2: These histograms show the range of colors from a gray Wratten filter. In a perfect test, all the pixels are the same color, appearing as a single vertical line on the histogram. The Nikon LS-3500 gave the best result, with the Barneyscan CIS•3515 a very close second. The Howtek Scanmaster 35/II saw many different shades of gray, resulting in a histogram spread over several levels.

Hand Tools.

You know what it's like. If you're in graphic arts, you know there's a lot of grunt-work.

Like rubbing-down type. And tracing and filling letters to comp-up headlines.

Trying to get true colors from a junkyard of dried-out markers.

Inking and re-inking rules and borders because of clogged pens.

T-squaring elements to be sure they're aligned and square.

Counting characters.

Spinning proportion wheels.

Tracing off the Lucy.

Wouldn't it be nice to spend more time exercising your brain instead of your wrist? Exploring concepts? Refining layouts? Trying "What if" design options? Or experimenting with color combinations?
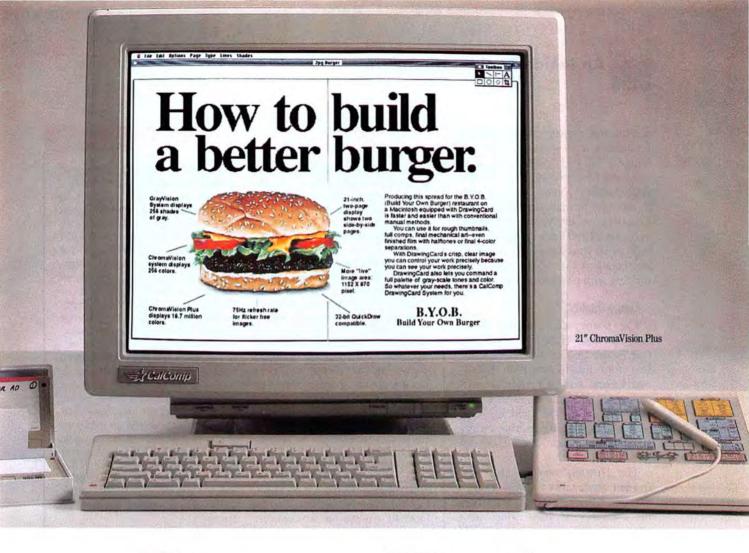
That's exactly what you can do using today's advanced layout, design, and illustration programs, the Macintosh II™ family of computers and a CalComp DrawingCard™ display system.

CalComp large screen displays help you get the most from your Macintosh. For one thing, they never let you lose sight of the big picture. DrawingCard is the first 21″ system to give you two full pages of color side-by-side at actual size. That's critical when you're designing double-truck ads, brochure spreads or creating a large horizontal illustration.

DrawingCard's flat screen eliminates distortion and with its excellent resolution and contrast you can see the effect of small changes in the colors right on the screen. Or evaluate the visual effect of half-point variations in type size and leading. You can even see the precise amount of letter overlap when you set your headlines "tight and touching."

And with DrawingCard displays, what you see on the screen is what you get on your printer because screen resolution is true 72 dpi.

scanner, and a lower resolution makes for a faster scan — scanning the test image at 768 x 512 reduced the scan-and-save time to 3 minutes 35 seconds. Second, you can save the scan in multiple formats simultaneously. Colorflex uses the separate red, green, and blue TIFF files to produce final images, so you can save the image in any or all of Colorflex's supported formats with a single command.

Image Quality

The Barneyscan and the Nikon scanners both yield excellent color (see Figure 1). The Howtek unit suffers from muddy and often inaccurate colors, with a particular deficiency in the yellows, which look green. The CIS•3515 and LS-3500 were also capable of capturing a wider range of color than the Scanmaster 35/II was.

The Howtek scanner also performed noticeably poorly in our Wratten-filter test (which measures the evenness of gray values in a scanned image), with the test slide's single gray level smeared across five or six levels in the scan (see Figure 2). The Nikon scanner gave the best result in this test, with Barneyscan's a very close second — so close, in fact, that the CIS•3515's minor imperfections would probably have no effect in the scanning of real-world images.

We expected performance on our resolution test to be directly related to the optical resolution of the scanner. As expected, the Nikon LS-3500, with a resolution of 6,144 x 4,096, outperformed its competitors handily. The Barneyscan CIS•3515 (1,024 x 1,520) came in such a close third to the Howtek Scanmaster 35/II (3,000 x 2,000) that the difference was almost too close to call. Obviously the quality of the optics has a considerable effect too.

Summary

Overall, we judged the Barneyscan scanner to have the best software. BarneyscanXP is a proprietary version of Adobe Photoshop (actually

The Bottom Line

All three of the slide scanners we tested are capable of extracting more information from a slide than can be successfully reproduced in print. They differ, however, in scanning speed, resolution, and the amount of tweaking necessary to produce a useful image.

The **Nikon LS-3500** ($9,995) could use friendlier software, but it wins overall for flexibility in resolution and for the wide range of controls it offers, from completely automatic operation through simple color-TV-type controls to very sophisticated tweaking. Focusing and calibration are both automatic. The LS-3500 has the highest resolution, at 6,144 x 4,096 pixels, and is the only scanner to offer variable input resolution. The Nikon Colorflex software lacks any postprocessing capabilities, but Nikon offers a free plug-in driver that allows you to scan directly from the Adobe Photoshop application.

The **Barneyscan CIS•3515** ($9,495) is a very close second to Nikon's LS-3500. The CIS•3515 gives notably sharper images than Barneyscan's earlier slide scanner, the CIS•3510, and also has improved color

accuracy. It is the easiest slide scanner to set up and has the fastest scan time and the best software — it's the only scanner to offer postscanning image-manipulation tools. Although it has the lowest resolution of the three scanners, at 1,520 x 1,024 pixels, the CIS•3515 provides images that are almost as sharp as the Howtek Scanmaster 35/II's, even though the Howtek has twice the resolution. On the minus side, the manual focus leaves you wondering if the image is *really* in focus, the image preview is in gray scale rather than in color, and the unit requires regular calibration.

The **Howtek Scanmaster 35/II** ($6,995) beats the other two in only one area — price. Given its slow scan times, poor color fidelity, and unfriendly software, we feel that the savings offered by the Scanmaster 35/II fail to compensate for the unit's overall poor performance. You can get usable images from the scanner but only after much tweaking with an application such as Adobe Photoshop. Fortunately, Howtek makes a scanner driver for Photoshop available free to registered owners of the scanner.

it's Photoshop's predecessor) and as such is worth a review unto itself. Nikon's Colorflex software has some quirks, particularly in its nonstandard file handling, but its powerful controls offer experienced users a greater degree of control over the scanning process itself than do those of either of its competitors. It has no postprocessing capabilities, however. In fact, Colorflex is not even able to display the image after it has been scanned.

Howtek's MacScan-It application is clumsy and suffers from some notable omissions. In addition to lacking a warning regarding unsaved images, the program fails to provide any means of scanning a landscape-oriented slide in its true horizontal orientation. Instead, you must scan it in portrait orientation and then resort to third-party software to rotate it 90 degrees.

The Barneyscan CIS•3515 and Nikon LS-3500 can both produce professional color scans for images

up to 5 x 7 inches, but they lack the resolution that's required for producing full-page high-quality color images. In addition, the sheer size of high-resolution files taxes the Mac to its limits — a 150-megabyte file is not unusual for a full-page image.

Soon-to-be-released midrange slide scanners (see the "On the Horizon" sidebar) will partially address the problem of insufficient resolution, but they won't turn Mac users into color prepress pros overnight. Experts in working with high-end color workstations know how to correct images for such arcane problems as the dot gain in the output device, the quirks of a particular printing press, different kinds of paper stock, and even ink impurities. Color printing is still a complex field, and that isn't likely to change in the very near future.

Bruce Fraser is a San Francisco-based free-lance writer, desktop publisher, and self-confessed Crystal Quest addict who remembers the days when a 330-megabyte hard disk seemed huge.

The five hand-held scanners (left to right): Asuka 270A, Complete PC Complete Half-Page Scanner/400, Logitech ScanMan Model 32, NCL ClearScan, and Thunderware LightningScan

Hand-Held Scanners

You don't need to spend thousands to play the image-capture game. Hand-held scanners can work wonders for those with a limited budget.

●

**BY
RON HIPSCHMAN
AND THE MACUSER LABS
STAFF**

You can now perform near miracles with text and graphics that you couldn't have imagined before you owned a Mac. Back in the Dark Ages (before 1984), our biggest graphics thrill was seeing a picture of Snoopy made of asterisks emerging from our Teletypes. We can now create high-quality graphics with a variety of programs, but unless you're an artist, creating graphics from scratch is a real effort. And for those of us who are on a limited budget, desktop scanners are priced out in the ozone (what's left of it, anyway). Fortunately, there's a solution: hand-held scanners.

Besides being inexpensive, light, and easy to set up and use, hand-held scanners have a distinct advantage over flatbed and sheetfed scanners:

They can take graphics straight out of books. You can even scan wallpaper by running a unit down a wall. (Try that with a flatbed!) The resolution of color hand-held scanners is generally too low for getting line art into a computer, but black-and-white scanners can handle the job. In a pinch, the black-and-white scanners even work well as input devices for OCR (optical character recognition).

We tested four hand-held scanners, each costing less than $700. Three were black-and-white models: the ScanMan Model 32 from Logitech, the LightningScan from Thunderware, and the Complete Half-Page Scanner/400 (CHPS) from Complete PC. The fourth was the color Clear-Scan from NCL. We also looked at several other interesting scanners that were still under development while this article was being written (see the "On the Horizon" sidebar) but that should be available by the time you read this.

The Scanners at Hand

The differences among the black-and-white scanners are cosmetic. All three use similar scanner heads (manufactured by Omron) and have selectable resolutions of 100 to 400 dpi. Each also has built-in selectable dither patterns for producing pseudo-halftones, and they offer software to convert the dithers into true gray-scale images. Gray-scale conversions shrink the image size, however, because a 6-x-6-pixel dither cell (36
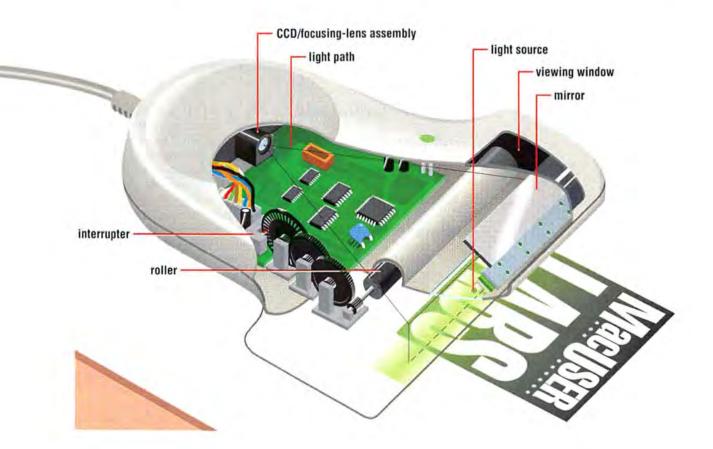
How It Works: Hand-Held Scanners

All the compact hand-held devices we tested use built-in LED or fluorescent light sources and CCD image detectors. You simply place them on the image you wish to scan, inform the software you'd like to bring in an image, and then manually roll the scanner slowly across the original.

A rubber roller on the bottom of the scanner rotates as you draw it across the image. Attached to this roller is a slotted wheel that interrupts a light beam and photocell in the scanner head, creating a series of electrical pulses that tell the computer how far you've rolled. This positional information is combined with the light-intensity information from the photodetector array to construct an image in your computer's memory (and then on your screen for you to see).

You can then save the image in a variety of formats or use the traditional Macintosh cut and paste methods to transfer the image to another application. The scanner software that comes with every unit allows you to print the image and perform some simple image manipulation.

- CCD/focusing-lens assembly
- light path
- light source
- viewing window
- mirror
- interrupter
- roller

pixels) is converted into a single gray pixel. Both black-and-white and color scanners let you save scanned images in various resolutions (usually 100, 200, 300, or 400 dpi) and formats (such as PICT, TIFF, or MacPaint).
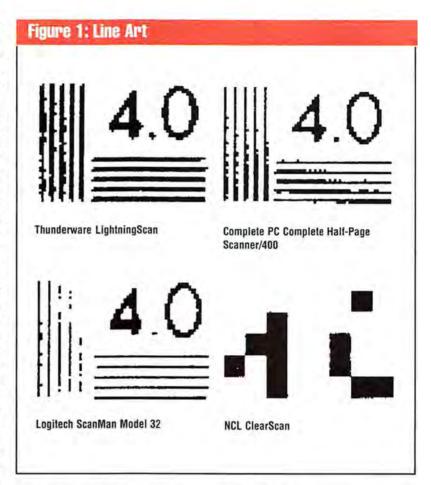
The color NCL ClearScan uses a scanner head manufactured by Mitsumi and has a maximum resolution of 90 dpi for each of the three primary colors — red, green, and blue. The hardware can detect 16 intensities (4 bits) for each of the primary colors, resulting in 12 bits, or 4,096 colors, but curiously, the software produces only 256-color (8-bit) output. Clear-Scan also does 4- and 8-bit grayscale scanning.

All the hand-held scanners consist of two parts, a scan head and a SCSI-interface box. Just plug the scan head into the SCSI-interface box, which in turn gets connected to your Mac's SCSI port. The CHPS has only one connector, so it'll be the last external device in your SCSI chain. Only the LightningScan is externally terminated (the terminator is provided). An internal terminator can be a problem if you have an internal drive and other external SCSI devices. Your local computer store or user group should be able to help you remove the terminator resistors from the SCSI-interface box if you don't feel comfortable doing this yourself. SCSI ID is easy to select with the same type of selector switches you find on external hard-disk drives.

The Sky Is Not the Limit

Given the low price, you expect to sacrifice something, and indeed all hand-held scanners have certain limitations when compared with their more expensive flatbed cousins.

One of the biggest drawbacks of hand-held scanners — their small size — is also a feature. The three black-and-white scanners we tested have a maximum scan width of 4.1 inches, but this is changing (see the "On the Horizon" sidebar). The NCL color scanner covers a maximum width of only 2.5 inches. Therefore, to scan large pictures, you need to

Figure 1: Line Art

Thunderware LightningScan

Complete PC Complete Half-Page Scanner/400

Logitech ScanMan Model 32

NCL ClearScan

scan multiple strips, assembling them with a painting or drawing program or with software that comes with the scanner. Unfortunately, this isn't as easy as it sounds.

The problem is that when you scan several adjacent strips for later assembly, you must be excruciatingly careful to scan *parallel* strips. Additionally, any slip of the scanner roller (which tells the software how far you've scanned) results in strips of different lengths. Another problem occurs if you scan in a slightly curved path, which adds further distortions to the scanned image. Needless to say, many artistic effects are possible if you roll these scanners in other-than-straight paths or even backward!

Solutions

Fortunately, some hand-held scanner manufacturers are addressing the problem of matching scan strips.

Figure 1: The three hand-held black-and-white scanners could resolve 8 line pairs per millimeter of our test strip; the NCL ClearScan resolved only 1.8 line pairs per millimeter. By comparison, the human eye can resolve about 6 line pairs per millimeter from a foot away.

Thunderware's LightningScan, for instance, does a good job of dealing with it. To combat the curving problem, a plastic SnapGuide that attaches to the scanner allows scanning along a straightedge, thus ensuring a straight scan.

The LightningScan comes with software called ThunderWorks, which does the best job of any of the programs that accompany these scanners in combatting nonparallel scans and distortion due to stretching. It

allows the "joining" of two scans into a single picture and is superior to a paint program for this purpose, mainly because of two tools: the Push-Pin and the Skoogie. You first import previously scanned left- and right-hand images. With the Skoogie tool, you align the tops of the images and "pin" them with a pushpin. Moving to the bottom of the image, you use the Skoogie tool to stretch and rotate the right-hand image around the top pushpin until it is aligned. Another

pushpin is placed at the bottom, and the Skoogie tool can now be used to stretch and bend the center of the images until they match. You can continue to Skoogie and place pins to your heart's content. Hats off to Thunderware for this gem!

NCL's ClearScan software also joins multiple scans, but it doesn't compensate for distortion. The Gather function lets you use the mouse to match up two or three scans (up to 7 inches wide in all), overlapping the

On the Horizon

Several innovative new scanners are coming that will soon shake up the hand-held-scanner market. We looked at prerelease versions of these scanners and advise scanner shoppers to keep them in mind.

The Mouse Systems PageBrush is both an optical mouse and a unique gray-scale hand-held scanner. The advantage here is that you can use the same device to click on the buttons of your software that you use to do the scanning.

As with other optical mice, you use a grid underneath the mouse, which in this case is clear plastic (there's no rolling ball). The mouse has two positional sensors that let the computer determine the rotation of the mouse as well as its x, y position. You slip a photo (or line art) under the grid, and a contact-sensor array on the bottom of the mouse lets you "paint" the image into your computer at 300 dpi with 6 bits (64 grays) per pixel.

A great advantage of the PageBrush is that you can go back over portions of the image you might have missed; as long as you don't pick the unit up off the grid, it remembers where it's been. Thus, you can scan very large images, which eliminates the problem of assembling separate 4-inch-wide scans. The scanned-image size is limited by your Mac's memory and the size of the grid you purchase from Mouse Systems (it will be available in a variety of sizes up to blueprint size). This is a truly revolutionary device that uses a sophisticated NuBus card for Mac IIs. It was expected to ship in August and to sell for around $799. Mouse Systems, 47505 Seabridge Drive, Fremont, CA, 94538; (415) 656-1117.

Another scanner that will cause a stir in the market is the Animus Color Hand Scanner. As with the color hand-held scanner we reviewed, the hardware is 12-bit, but instead of limiting the number of colors to 256 (8 bits), the software interpolates to 16.7 million colors (24 bits)! Another difference is the scan width: almost 5 inches, twice that of the color hand-held scanner we reviewed. If that isn't tempting enough, it comes bundled with ColorScan MacCheese, a low-end but highly rated 24-bit paint program, and Read-it! OCR software from Olduvai. The Animus Color Hand Scanner was expected to ship in August for a retail price of $599. If the shipping version works as well as the beta we saw, it should be a hot item. Animus, 12675 Colony St., Chino, CA 91710; (714) 590-3940.

Marstek, a newcomer to the Macintosh market, will introduce three black-and-white scanners: the Mars 105, the Mars 128, and the Mars 800. The black-and-white software for the scanners is simplistic compared with the current state of the art, but the hardware looks solid. The Mars 105 is a generic scanner, with a 4-inch scan window

and a 400-dpi sensor array. The Mars 128's scan head is 5 inches wide but has a lower-resolution, 200-dpi, array. The Mars 800 will have a 400-dpi array that will allow interpolation of a scanned image to 800 dpi. These scanners were expected to be released in the summer, but pricing was unavailable at press time. Marstek, Inc., 17785-A Skypark Circle, Irvine, CA 92714; (714) 833-7740.

Another summer release was expected from Asuka, which is introducing three new scanners. The Asuka NuScan Grayscale Scanner will offer 4-inch-wide 400-dpi true-8-bit scanning (256 grays). It will sell for $599 with a SCSI interface and $499 with a NuBus card. The NuScan Color is a 90-dpi-per-color, 2.5-inch-wide color scanner that can scan up to 256 colors. It also comes with a SCSI interface ($799) or a NuBus card ($649). The company is also introducing an interesting sheetfed scanner; the scan head of this unit can be detached from the motorized paper feed to become an 8-inch-wide hand-held scanner! The 8-inch scanner will sell for $799 with SCSI interface and $649 with NuBus card.

Last, but certainly not least, NCL is adding to its ClearScan line. The Professional ($949) will have color and black-and-white heads in one unit, which NCL says will yield a sharper image for black-and-white than a color head can give. The expected released date was this summer.

The Mouse Systems PageBrush is a mouse and scanner in one unit.

Figure 2: Gray Linearity

Scanned values

Gray value of original image

— monochrome hand scanner
— color hand scanner
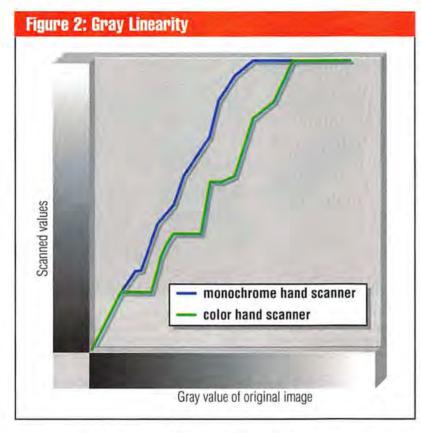
Figure 2: A straight line indicatates an even spread of gray values. The hand-held black-and-white scanners, which all use similar scan heads, yielded plots like the one shown, which is fairly linear. The plot for the NCL ClearScan is stepped. Each step shows that the color scanner interprets a range of grays as a single gray.

area common to the scans. Clear-Scan has some other nice features. The Create Image command automatically creates an alterable color palette. There are also filters, which can be used to create certain special effects.

ThunderWorks has similar features for gray scale that can blur, sharpen, find edges, diffuse, lighten, darken, despeckle, smooth, and add relief. You can also bring up a histogram of the grays in the image, a feature that can help determine how to manipulate what you see.

Thunderware, Logitech, and Complete PC provide facilities for 32-level (5-bit) gray-scale conversion, brightness and contrast manipulation, and rudimentary paintlike touch-up tools. (Complete PC added gray scale to its software, SmartScan, only after our testing was finished.) The touch-up tools work in true gray scale in all programs.

The Logitech ScanMan software also has its share of new features.

One nifty one is the ability to scan a graphic from top to bottom, from left to right, or from right to left. You can achieve the same results with ThunderWorks by rotating the image after it's been scanned, but Logitech is to be commended for thinking of this time-saving feature. The Scan-Man and the Complete PC CHPS require a scanner driver to be placed in the System Folder.

Despite the nice features, some of this software is not very intuitive and can be downright frustrating. There is a confusing lack of consistency in that of the Thunderware Lightning-Scan and Logitech ScanMan, the only two scanners to come with DA versions of their scanning software. Certain features appear in the DA version but not in the application, and vice versa.

To the Test

In addition to scanner features, the quality of the art the scanners produce is an important consideration.

We tested each scanner for resolution, gray-scale range, linearity (evenness of response to the range of grays), and image quality (halftone and line art). All scanners showed a high level of consistency between successive scans.

To test resolution, we scanned the Image System Test Chart published by the U.S. Department of Commerce Patent and Trademark Office (see Figure 1). This chart has sets of black and white line pairs of varying fineness, from 1 pair per millimeter to 18 pairs per millimeter. (The human eye can resolve about 6 line pairs per millimeter, held one foot away.) The black-and-white scanners all resolved 8 line pairs per millimeter. The NCL ClearScan resolved 1.8 lines per millimeter, because of the lower-resolution RGB triads of its color-detector arrays. Note that the black-and-white scanners, at around $500, yielded the same result as the $29,000 Varityper 1200 flatbed scanner (which includes

a Mac IIcx), reviewed in the "Desktop Scanners" report in this issue.

We tested the linearity and gray-scale range of three of the scanners by scanning a Kodak SR-37 test strip. (The CHPS is black-and-white only and does not interpolate gray scale.) The SR-37 contains 37 gray blocks, starting at white, that get progressively darker by 12 percent per block. The strip was scanned, and the resulting file was analyzed in Photoshop. The results are plotted in Figure 2. We plotted one curve for the Scan-Man and one for the NCL ColorScan. (The LightningScan's results were nearly identical to those of the Scan-Man.) The results of the NCL scanner were not nearly as linear as those of the black-and-white scanners. Instead, the curve was stepped, which shows that the NCL condensed a group of gray values into a single value.

To test image quality, we scanned a piece of line art and a continuous-tone photo. The results were judged subjectively by the staff of MacUser Labs and the author. The CHPS, LightningScan, and ScanMan all performed excellently on the line art, with printouts proving almost indistinguishable from the originals except for a little fill-in in high-density areas. This test yielded unacceptable results from the NCL ClearScan.

For producing a dithered image from a photograph, the LightningScan came out on top, followed closely by the CHPS. The ScanMan was next, and the NCL ClearScan color scanner produced the worst quality. Surprisingly, the NCL color scanner produced the best black-and-white output on the LaserWriter from its lower-resolution scans. This brings up an important point: The resolution and dither chosen for scanning must match (or be a multiple of) the resolution of the output device, or the results may be disappointing. Don't scan at 400 dpi if you're outputting to a 72-dpi ImageWriter!

For OCR work, the black-and-white scanners provided excellent results as long as we were careful to

The Bottom Line

If you need a hand-held scanner to do a variety of jobs, we recommend the **Thunderware LightningScan** ($495) as the best gray-scale package, combining good hardware performance with the best software we looked at, ThunderWorks. We were impressed by ThunderWorks' array of tools, especially the Skoogie tool. (Keep in mind, though, that the Mouse Systems Page-Brush will make the Skoogie unnecessary.) If you have more-sophisticated image-processing needs, there is always Image-Studio, Digital Darkroom, or Photoshop.

The **NCL ClearScan** ($695) is not as advanced as the black-and-white scanners;

the scan width is much narrower, the software not as sophisticated, and the resolution nowhere near that of gray-scale hand-held scanners and color flatbed scanners. It does an acceptable job at a low cost, however. The software is easy to use and includes some features that aid in the task of dealing with color.

All this said, we highly recommend that you take a look at two of the scanners discussed in the "On the Horizon" sidebar, the Mouse Systems PageBrush and the Animus Color HandyScan — it's safe to say that they represent the next generation of hand-held scanners.

set the scanners' brightness knobs properly. The color NCL ClearScan didn't work well for OCR at all — we wouldn't recommend a color scanner for this purpose.

Summary

As you can tell, we were much more impressed with the monochrome scanners than we were with the color one. But although we may seem guilty of color-scanner bashing, we aren't forgetting that using a color hand-held scanner is the only way to scan color into your computer for less than $700. A color scanner is also the only device that can directly scan in true gray scale: The monochrome scanners scan in 1-bit and interpolate gray scale. But this is one technology that is rapidly changing,

and you can expect great improvements in both areas over the next year.

If you own older versions of these scanners, don't despair. Thunderware will take your old scanner, SCSI-interface box, and $189 and send you a new scanner, interface, and software. Complete PC offers a free upgrade to its new software. Logitech will send you its new scan head and software for just $125. No modification of your SCSI box is necessary, and you can keep the old scan head. Why you would need the old one is another story — one for each hand, perhaps?

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Table 2: Features of Flatbed Scanners

	Abaton 8-Bit Apple Upgrade	Abaton Scan 300/GS	Agfa Focus II 800GSE	Apple Scanner
Mouse rating	♨♨♨♨	♨♨♨½	♨♨♨♨½	♨♨♨
List price	$595	$1,595	$6,945*	$1,879*
Comments	Greatly improves gray-scale levels of Apple Scanner.	Good halftones. Nice software bundle.	Excellent optional software. High resolution. Intuitive software.	Only 16 gray levels. Remote-scan button.
Automatic document feeder	no	no	no	no
System requirements	1-MB Mac Plus	1-MB Mac Plus	1-MB Mac Plus	1-MB Mac Plus
True resolution	300 dpi	300 dpi	400 dpi	300 dpi
Other resolution settings	72 – 300 dpi in 1-dot increments	72 – 300 dpi in 1-dot increments	100 – 200 dpi in 25-dot increments; 200-400 dpi in 50-dot increments; 500, 600, 700, 800 dpi	75, 100, 150, 200 dpi
Pixel depths	1, 4, and 8 bits	1, 4, and 8 bits	1, 6, and 8 bits	1 and 4 bits
Engine manufacturer	TEC	TEC	Agfa	TEC
Scan modes				
Halftone (dither patterns)	yes	yes†	yes§	yes
Gray-scale	yes	yes	yes	yes
Color	no	no	no	no
Number of dither patterns	24	2	4 (plus your own)	2
Maximum scan area (inches)	8.5 x 14 in.	8.5 x 14 in.	8.25 x 12.75 in.	8.5 x 14 in.
Interface	SCSI	SCSI	SCSI	SCSI
Bundled software	Abaton Scan DA, Darkroom, ImageStudio	Abaton Scan, Digital	McViewPlus II ($495 — not bundled)	AppleScan, HyperScan
Software implementation				
Application	no	no	yes	yes
DA	yes	yes	no	no
Plug-in	yes	yes	no	no
Scan to disk	yes	yes	yes	yes
Preview zoom	no	no	no	yes
Cropping	yes	yes	yes	no
Resizing capability	no	no	any size	25 – 400%
Zoom edit	yes	yes	yes	yes
Gray-scale editing	yes	yes	yes	yes
Brightness/contrast controls	yes	yes	yes	yes
File formats				
EPS	yes	yes	yes	no
Paint	yes	yes	yes	yes
PICT	no	no	yes	no
PICT2	yes	yes	yes	yes
RIFF	no	yes	no	no
TIFF	yes	yes	yes	yes
TIFF compressed	no	yes	yes	no
Weight (pounds)	20 lb	22 lb	33 lb	20 lb
Controls on scanner	none	none	none	remote scan
PC compatibility	no	yes	yes	no
Threshold control	software/hardware (chip)	software/hardware (chip)	software	software
Warranty	1 year	1 year	90 days	90 days
Manufacturer	Abaton 48571 Milmont Drive Fremont, CA 94538 (800) 444-5321 (415) 683-2226	Abaton 48571 Milmont Drive Fremont, CA 94538 (800) 444-5321 (415) 683-2226	Agfa Compugraphic 80 Industrial Way Wilmington, MA 01887 (508) 658-5600	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010

*Price includes options.

†Not implemented.

§Included in system price.

Table 2: Features of Flatbed Scanners, continued

	Datacopy Model 830	DEST PC Scan 3000	Hewlett-Packard ScanJet Plus	Howtek Scanmaster
Mouse rating	♦♦♦½	♦♦♦♦	♦♦♦½	♦♦♦♦
List price	$3,495	$1,595	$2,190*	$8,195
Comments	Very good halftones. Software claims 8-bit but produces 6-bit scans.	Best 300-dpi resolvability. Very even illumination.	Fast. Easy to use. Excellent, intuitive software (DA).	Very large. Slow. Powerful color controls in software. Poor OCR.
Automatic document feeder	optional, $595	optional, $695	optional, $595	no
System requirements	1-MB Mac Plus	1-MB Mac Plus	1-MB Mac Plus	1-MB Mac II
True resolution	300 dpi	300 dpi	300 dpi	300 dpi
Other resolution settings	75, 100, 120, 150, 180, 200, 240 dpi	38 – 600 dpi in 1-dot increments	12 – 300 dpi in 1-dot increments; 600 dpi	30 – 300 dpi in 1-dot increments
Pixel depths	1, 4, and 6 bits	1 and 8 bits	1, 4, and 8 bits	1, 3, 8, and 24 bits
Engine manufacturer	Ricoh	Matsushita	Canon	Sharp
Scan modes				
Halftone (dither patterns)	yes	yes	yes	no
Gray-scale	yes	yes	yes	yes
Color	no	no	no	yes
Number of dither patterns	5 (plus your own)	4	6	none
Maximum scan area (inches)	8.5 x 11.75 in.	8.5 x 11 in.	8.5 x 11.5 in.	11 x 17 in.
Interface	SCSI converter	SCSI	SCSI converter	GPIB via NuBus
Bundled software	MacImage	Publish Pac	DeskScan, DeskPaint	MacScan-It
Software implementation				
Application	yes	yes	no	yes
DA	no	no	yes	no
Plug-in	no	no	no	no
Scan to disk	yes	yes	yes	yes
Preview zoom	yes	yes	yes	no
Cropping	yes	yes	no	yes
Resizing capability	no	12.7 – 200%	4 – 200%	any size
Zoom edit	yes	yes	yes	no
Gray-scale editing	yes	yes	no	no (global)
Brightness/contrast controls	yes	yes	yes	postscan
File formats				
EPS	yes	yes	yes	no
Paint	yes	yes	yes	no
PICT	yes	no	yes	no
PICT2	no	no	yes	yes
RIFF	no	yes	no	yes
TIFF	yes	yes	yes	yes
TIFF compressed	yes	yes	no	no
Weight (pounds)	20 lb	18 lb	7 lb	55 lb
Controls on scanner	none	none	none	none
PC compatibility	yes	yes	yes	yes
Threshold control	software	software	none	software
Warranty	90 days	90 days	1 year	90 days
Manufacturer	Xerox Imaging Systems 535 Oakmead Parkway Sunnyvale, CA 94086 (800) 248-6550 (408) 245-7900	DEST 1015 E. Brokaw San Jose, CA 95131 (408) 436-2700	Hewlett-Packard 19031 Pruneridge Ave. Cupertino, CA 95014 (800) 752-0900 (303) 350-4444	Howtek 21 Park Ave. Hudson, NH 03051 (603) 882-5200

*Price includes options.

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24733	DaynaFile 5.25" 360K/1.2MB	$725
24930	Rapport Disk Drive (Kennect Technologies)	$195
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24386	20MB Ext. HD (Cutting Edge)	$335
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24390	40MB Ext. Qtm. HD (Protegé)	$455
24382	80MB Ext. HD (Protegé)	$525
24388	80MB Ext. HD (Cutting Edge)	$579
24391	80MB Qtm. HD (Protegé)	$645
24383	100MB Ext. HD (Protegé)	$649
24389	100MB Ext. HD (Cutting Edge)	$779
24392	105MB Ext. Qtm. HD (Protegé)	$695
24180	20MB Int. HD - SE (CompuAdd)	$295
24184	20MB Int. HD - Mac II (CompuAdd)	$295
24181	40MB Int. HD - SE (CompuAdd)	$325
24185	40MB Int. HD - Mac II (CompuAdd)	$325
24182	80MB Int. HD - SE (CompuAdd)	$465
24186	80MB Int. HD - Mac II (CompuAdd)	$465
24183	100MB Int. HD - SE (CompuAdd)	$575
24187	100MB Int. HD - Mac II (CompuAdd)	$575
24384	Bernoulli 40-40 (IOmega)	$2,799
24385	Portable 44MB (IOmega)	$1,850
23830	QT-40 40MB Tape Sys (Tecmar)	$950
23831	QT-80 80MB Tape Sys (Tecmar)	$1,225
24931	QT-40 Cable Kit (Tecmar)	$106
26080	QT-80MB/2 Cart. (Tecmar)	$85
57440	3.5" Diskettes 1.2MB 10Pk"(Sony)	$29
57401	3.5" Diskettes 800KB 10Pk"(Sony)	$15
41601	Teak 3.5" Double Rolltop Box	$29
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Printers, Scanners & FAXes
56800	HP LaserJet Series II (Hewlett-Packard)	$1,699
22851	MicroLaser PostScript w/ATalk (Texas Inst.)	$2,425
22850	DeskWriter Inkjet (Hewlett-Packard)	$849
56339	LQ-2550 - 24 pin Prtr. (Epson)	$999
56340	LQ-510 - 24 pin Prtr. (Epson)	$339
56303	LX 810 - 9 pin Prtr. (Epson)	$195
22852	Label Printer (Seiko Inst.)	$195
22752	Half-page Scanner (Complete PC)	$313
22753	Page Scanner (Complete PC)	$758
22758	Computer Eyes B/W Scan (Digital Vision)	$196
22759	Computer Eyes Color (Digital Vision)	$344
22750	HP Scanjet w/ interface (Hewlett-Packard)	$1,689
22755	300Z Color Scanner (MicroTek-IMSI)	$2,049
22756	MS-II B&W Scan. (MicroTek-IMSI)	$1,080
22757	Thunderscan Plus (Thunderware)	$199
22751	ScanMan 32 (Logitech)	$317
22701	DoveFax-Ext. (Dove)	$270
22700	Relisys TeFAX RA2110 (Tefex)	$1,295
26902	Labels for Seiko Label Printer (Seiko)	$11.99
38713	Second Paper Drawer (Texas Inst.)	$325
38712	Envelope Feeder (Texas Inst.)	$299
38564	Laser: Appletalk Comm. Cd. 232 (Texas Inst.)	$125
38563	Laser: 1MB memory Kit (Texas Inst.)	$399
38311	Laser: Micro Toner Cartidge (Texas Inst.)	$59

Communications - Modem
49525	Modem: 1200 Ext. w/o SW (CompuAdd)	$89
49557	Modem: 2400 Ext w/o SW (CompuAdd)	$129
22306	Modem: Datalink Express (Applied Eng.)	$215
22308	Modem: Datalink Macport. (Applied Eng.)	$299
22307	Modem: Datalink Mac (Applied Eng.)	$325
49501	Modem: Smartmodem 1200 (Hayes)	$299
49576	Modem: Smartmodem 2400 (Hayes)	$385
49578	Modem: Smartmodem 9600 (Hayes)	$895
22507	NetModem V2400 (Shiva)	$435
22528	NetModem V.32 9600 baud (Shiva)	$1,289
22309	MMPL5 Protocal adapt. (Applied Eng.)	$79
22310	Send Fax Adapter (Applied Eng.)	$79

Communications - Network
22500	Nodem Thick (Adaptec)	$395
22527	Nodem Thin (Adaptec)	$395
22508	Ethergate (Shiva)	$1,825
22510	FastPath 4 Gateway (Kinetics)	$1,935
22509	Interbridge (Hayes)	$645
22520	Localtalk Conn. DB-9 (Interex)	$32
22521	Localtalk Conn. Din-8 (Interex)	$32
22524	MacCon II/E (Asanti)	$395
22529	MacCon II/E UTP (Asanti)	$395
22530	MacCon SE30/E (Asanti)	$395
22531	MacCon SE30ETP (Asanti)	$395
22526	MacCon SE30TK (Asanti)	$395
22533	MacCon SEE (Asanti)	$295
22525	MacCon SEETK (Asanti)	$295
22532	MacCon SEETP (Asanti)	$292
22505	NetBridge (Shiva)	$339
22504	NetSerial X232 (Shiva)	$275
22511	PhoneNet Connector DB-9 (Farallon)	$34
22513	PhoneNet Connector Din-8 (Farallon)	$31
22517	PhoneNet Repeater (Farallon)	$313
22515	PhoneNet Star Conn. 10 pk (Farallon)	$138
22512	PhoneNet Star Connector (Farallon)	$18
22516	PhoneNet Star Controller (Farallon)	$888
22514	PhoneNet to Localt. Adapt. (Farallon)	$31
22534	PhonNetDin-8 10pk (Farallon)	$215

Communications - Network (continued)
22519	Portable Pack (Farallon)	$373
22518	Star Wiring Kit Harmonica (Farallon)	$64
22506	TeleBridge (Shiva)	$339

Monitors & Video Card
22006	19 Mon. w/Color Bd. 208 (Rasterops)	$4,550
22008	L-View Multi. Mon. w/card (Sigma Designs)	$1,495
22002	14" Color Monitor w/o card (Seiko Inst.)	$595
22000	19 Colormax w/card (Sigma Designs)	$4,999
22100	P.V. 15" Mon.w/ Mac II adptr. (Sigma Designs)	$1,050
22101	P.V. 15" Mon. w/ SE adptr. (Sigma Designs)	$999
22106	P.V. 15" Mon. w/ SE/30 adptr. (Sigma Designs)	$1,050
22191	P.V. 15" Mon. w/o adptr. (Sigma Designs)	$645
22005	14" Mon. w /Color Bd. 208 (Seiko/Rasterops)	$930
22001	14" Mon. w/Color Bd. 264 (Seiko/Rasterops)	$1,160
22103	S.V. 21" w/ SE/30 adptr. (Sigma Designs)	$1,599
22104	S.V. 21" w/Mac II adptr. (Sigma Designs)	$1,599
22107	S.V. 21" w/SE adptr. (Sigma Designs)	$1,599
22190	S.V. 21" w/o adptr. (Sigma Designs)	$1,095
22007	GS30 Grey Scale 19" Mon. (Rasterops)	$1,795
23538	Color Board 208 (Rasterops)	$365
23531	Color Board 264 (Rasterops)	$595
23539	Color Board 264/SE-30 (Rasterops)	$745
23540	Color Board 364 (Rasterops)	$1,495
23530	Multiscreen Card (Mobius)	$295

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23632	Acc. 030 25mhz II w/co 6888 (DayStar)	$1,149
23633	Acc. 030 33mhz II w/co 6888 (DayStar)	$1,539
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23641	Acc. 030 33mhz IIcx w/co 68882 (DayStar)	$1,539
23642	Acc. 030 40mhz IIcx w/co 68882 (DayStar)	$1,919
23636	Acc. Dove 33mhz SE-30 board (Dove)	$445
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23634	Acc. IIci CACHE Card (DayStar)	$754
23733	DigiVideo B/W Card (Aaps)	$399
23735	DigiVideo Color Card (Aaps)	$644
23731	MicroTV (Aapps)	$275

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25480	2 X 1MB SIMMS (80ns) (Technology Works)	$150
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25283	Little Mouse (Mouse Systems)	$77
25180	Mac-101 Keyboard, ADB (DataDesk)	$134
25181	Mac-101 Keyboard (beige) (DataDesk)	$134
25282	Mobius Cordless Mouse (Mobius)	$89
26885	Bit Pad Plus (Summagraphics)	$318
25183	Switchball (DataDesk)	$115
25182	Switchboard (DataDesk)	$174
25284	Trackball ADB (Mouse Systems)	$72
25280	Turbo Mouse Plus (Kensington)	$107
25281	Turbo Mouse ADB (Kensington)	$107

Power Supplies & Fans
26880	Fanny Mac (fan) (Mobius)	$58
26888	System Saver Fan Plus (Kensington)	$62
26889	System Saver Fan SE (Kensington)	$62
26293	Powerchute Ntwk UPS Software (A.P.C.)	$99
26292	UPS, Uninterruptible supply (A.P.C.)	$275

Sound Interfaces
23730	MacRecorder (Farallon)	$162
23732	MIDI Interface (Passport Designs)	$76

Accessories
41026	Data-Vac MDV-1 w/hose and acc.	$49
41753	Keyboard drawer (CompuAdd)	$19
41019	Kleen Keyboard Kit (CompuAdd)	$10
26883	Anti-Glare Filter (platinum) (Kensington)	$32
26882	Anti-Glare Filter (beige) (Kensington)	$32
26891	Apple Color Mon. Pol. Filter (Kensington)	$62
26886	HyperDialer (DataDesk)	$32
26895	Imagewriter II Dust Cover (Cover-up)	$8
26897	LaserWriter II Dust Cover (Kensington)	$12
26898	Mac Carrying Case (Pace)	$65
26901	Mac Carrying Case Ext. Kbd. (Pace)	$76
26892	Mac II Stand & Cable Kit (Kensington)	$63
26887	Mac II System Stand (Kensington)	$20
26894	Mac Plus/SE Sys Saver Cover (Cover-up)	$8
26893	Masterpiece Mac II (Kensington)	$103
26896	Universal Printer Stand (Kensington)	$15
25580	Mac II Monitor Stand (Kensington)	$15
25582	Tilt/Swivel Stand (Kensington)	$21
40510	Surge Suppressor (Tripplite)	$29
26884	Security Kit (Kensington)	$33
41752	Teak KB Drawer PSK 132 (CompuAdd)	$72
26881	Tool kit; 3 pieces (Interex)	$15
26903	The Library (grey)	$12

Software

Writing & Publishing

Word Processing (Writing)
30600	FullWrite Prof. (Ashton-Tate)	$253
30586	MacWrite II 1.1 w/ ATM (Claris)	$157
30582	Microsoft Word (Microsoft)	$245
30580	Microsoft Works (Microsoft)	$177
30584	Microsoft Write (Microsoft)	$77
30602	Nisus (Paragon Concepts)	$236
30590	WordPerfect Mac 1.03.0 (WordPerfect)	$227
30588	WriteNow (T/Maker)	$116

Page Layout (Publishing)
29792	Letraset Ready-Set-Go (Letraset)	$273
29781	Pagemaker (Aldus)	$497
29822	Publish-it (Timeworks)	$223
29802	Quark Xpress 2.11 (Quark)	$445
29796	Silicon Press (Silicon Beach)	$51
29814	Springboard Publisher (Springboard)	$107

Utilities for Writers/Publishers
30606	Acta Advantage (Symmetry)	$63
30618	Big Thesaurus1.0 (Deneba Software)	$63
30594	Findswell (Working Software)	$35
30440	Letter Writer Plus (Power Up)	$54
29820	MacKern (ICOM Simulations)	$113
30604	More II (Symantec)	$265
29786	PageMaker Color Ext. (Aldus)	$133
29800	QuarkStyle 1.0 (Quark)	$165
30598	QuickLetter (Working Software)	$72
30622	WordFinder 2.0 (Microlytics)	$31

Spelling Checkers
30620	Spelling Coach Pro 3.1(Deneba Software)	$112
30596	Spellswell (Working Software)	$44

Fonts & Font Utilities
	Adobe Fonts — All 134 available	CALL
30444	Freedom of Press (Custom Applications)	$255
29824	Type Manager [ATM] (Adobe)	$55
29828	Type Mgr/Type Align (Adobe)	$88
29830	Type Reunion (Adobe)	$38
29826	TypeAlign (Adobe)	$58
29834	Plus Pak (Adobe)	$107

Business Software

Integrated & Bundled Applications
30182	Microsoft Office Bundle (Microsoft)	$525
30580	Microsoft Works (Microsoft)	$177

Accounting/Bookkeeping
28481	Accountant Inc. Prof (Softsync)	$348
28466	Business Sense (Monogram)	$265
28468	Checkwriter II (Aatrix)	$37
28464	Dollars & Sense (Monogram)	$78
28474	Easy-Light (DAC)	$41
28440	Insight Accounts Payable (Layered)	$395
28442	Insight Accounts Receivable (Layered)	$395
28454	Insight At Once (Layered)	$283
28444	Insight General Ledger (Layered)	$395
28446	Insight Inventory (Layered)	$395
28448	Insight Payroll (Layered)	$395
28450	Insight Time Bill (Layered)	$395
28478	MacMoney 3.5 (Survivor Software)	$58
28462	Managing Money (Meca)	$122
28458	Quicken (Intuit)	$35

Data Analysis & Presentation
28470	StatView II (mac+,SE, II)" (Abacus Concepts)	$278
28472	StatView SE + Graphics (Abacus Concepts)	$199

Database Management
27780	4th Dimension (Acius)	$511
27782	4th Dimension Runtime (Acius)	$85
27788	Claris Filemaker Prof (Claris)	$216
27800	dBASE Mac (Ashton-Tate)	$379
27802	DBase Runtime (Ashton-Tate)	$569
27804	Double Helix (Odesta)	$369
27790	FoxBase II (Fox Software)	$292
27796	FoxBase Mltuser Runtime (Fox Software)	$293
27794	FoxBase Multiuser (Fox Software)	$385
27798	Microsoft File (Microsoft)	$123
27808	Panorama (ProVue)	$246

Office Productivity Programs & Utilities
30442	Address book Plus (Power-up)	$52
27812	BulkMailer 3.3 (Satori Software)	$76
27814	BulkMailer Plus (Satori Software)	$187
30432	Calender Creater + Mac (Power Up Software)	$36
30358	Calender Maker (CE Software)	$30
27818	DataDesk Prof. 3.0 (Odesta)	$347
30438	Fast Forms 2.0 (Power-up)	$116
30372	Kiwi Envelopes (Kiwi Software)	$34
30440	Letter Writer Plus (Power Up)	$54
27816	MailList (MySoftware)	$27
27806	Milo (Paracomp)	$156
29200	Smartforms Designer (Claris)	$291

Time & Project Scheduling
29744	Fast Track Schedule (AEC)	$108
27810	KeyPlan (Symmetry)	$243
29740	MacProject II 2.1 (Claris)	$366

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If you can't set up an elaborate scanning station, try the hand-held ScanMan from Logitech. You'll get 32 shades of gray in photographs, drawings, logos, and illustrations up to four inches wide. Connects directly to the Mac SCSI for easy installation. Resolution from 72dpi to 400dpi delivers a quality image both on screen and on paper. **ScanMan 32**. *22751* - $317

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M - O - N - E - Y

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Forget those nasty jagged edges on the bit-mapped letters of your screen fonts. Adobe TypeManager gives you the look of Post-Script type and it improves the output of your non-postscript printer. By eliminating the need to store several sizes of each font, TypeManager saves drive space.
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Adobe Plus Pak. *29834* - $107

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SimCity. *28678* - $28
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Table 2: Features of Flatbed Scanners, continued
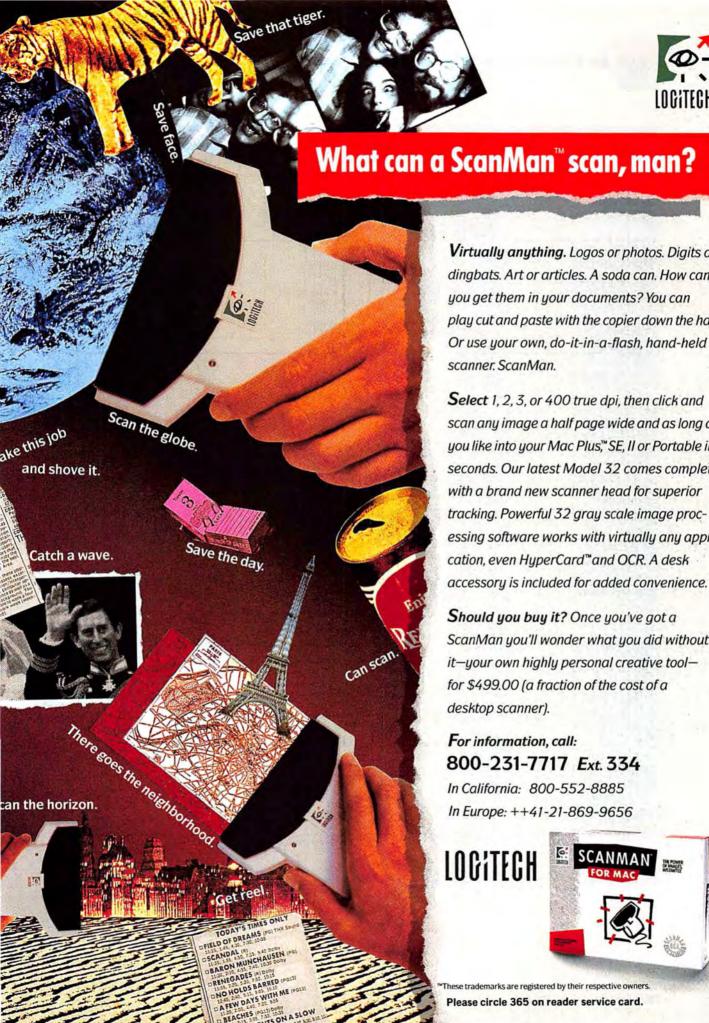
	Microtek MSF-300GS	Microtek MSF-300Z	Pentax SB-A4301 Model 2	Sharp JX-100
Mouse rating	♦♦♦½	♦♦♦♦	♦♦½	♦♦♦½
List price	$2,195	$2,695	$1,799	$995
Comments	Nice software bundle.	Nice software bundle. Mediocre OCR. Separate DAs for color and black-and-white.	Poor gray-scale. Scan to RAM only. A DA will be released soon.	Least expensive. Small. Good resolvability. Low resolution. Scans to RAM only.
Automatic document feeder	no	no	no	no
System requirements	1-MB Mac Plus	1-MB Mac SE/30	2-MB Mac Plus	4-MB Mac II
True resolution	300 dpi	300 dpi	300 dpi	200 dpi
Other resolution settings	75 – 300 dpi in 16 levels	75 – 300 dpi in 16 levels	none	50 – 200 dpi
Pixel depths	1 and 8 bits	1, 8, and 24 bits	4 bits	1 or 8 bits
Engine manufacturer	Microtek	Microtek	Pentax	Sharp
Scan modes				
Halftone (dither patterns)	yes	yes	no	yes
Gray-scale	yes	yes	yes	yes
Color	no	yes	no	yes
Number of dither patterns	12	12	none (5 dithers possible)	5
Maximum scan area (inches)	8.5 x 14 in.	8.5 x 14 in.	8.5 x 12 in.	4.0 x 6.25 in.
Interface	SCSI	SCSI converter	SCSI	serial
Bundled software	Digital Darkroom, ImageStudio, Microtek DA	Digital Darkroom, ImageStudio, Microtek DA, PhotoMacEdit	Digital Darkroom, SuperPaint	ChromaScan
Software implementation				
Application	no	no	no	yes
DA	yes	yes	no	no
Plug-in	yes	yes	no	no
Scan to disk	yes	yes	NA	no
Preview zoom	no	no	NA	no
Cropping	yes	yes	NA	yes
Resizing capability	25 – 400%	25 – 400%	NA	yes
Zoom edit	yes	yes	NA	no
Gray-scale editing	yes	yes	NA	no
Brightness/contrast controls	yes	yes	NA	yes
File formats				
EPS	yes	yes	NA	no
Paint	no	no	NA	no
PICT	yes	yes	NA	no
PICT2	yes	yes	NA	yes
RIFF	yes	yes	NA	no
TIFF	yes	yes	NA	no
TIFF compressed	no	no	NA	no
Weight (pounds)	24 lb	24 lb	25 lb	4 lb
Controls on scanner	none	none	contrast, halftone, on-line*	none
PC compatibility	yes	yes	yes	yes
Threshold control	software	software	hardware	software
Warranty	6 months	6 months	1 year	90 days
Manufacturer	Microtek Lab 680 Knox St. Torrance, CA 90502 (800) 654-4160 (213) 321-2121	Microtek Lab 680 Knox St. Torrance, CA 90502 (800) 654-4160 (213) 321-2121	Pentax Teknologies 100 Technology Drive Broomfield, CO 80020 (303) 460-1600	Sharp Electronics Sharp Plaza Mahwah, NJ 07430 (800) 237-4277 (201) 529-9500

*Not implemented.

Table 2: Features of Flatbed Scanners, continued

	Sharp JX-300	UMAX UG80	Varityper 1200
Mouse rating	�host♁♁½	♁♁♁½	♁♁♁♁
System price	$4,565*	$1,895	$29,000
Comments	Scan to RAM only. Most-realistic color. GPIB interface difficult to configure.	Excellent resolvability and gray-scale. Convenient and easy to maintain.	Most expensive (includes IIcx). High resolution. Excellent OCR. Powerful software controls.
Automatic document feeder	no	optional, $525	no
System requirements	2-MB Mac II	2-MB Mac Plus	8-MB Mac IIcx†
True resolution	300 dpi	300 dpi	400 dpi
Other resolution settings	30 – 300 dpi in 6 levels	1 – 300 dpi in 1-dot increments	7.5 – 1,200 dpi in 1-dot increments
Pixel depths	1, 4, 8, and 24 bits	1, 4, and 8 bits	1 and 8 bits
Engine manufacturer	Sharp	UMAX	Xerox
Scan modes			
Halftone (dither patterns)	yes	yes	yes
Gray-scale	yes	yes	yes
Color	yes	no	no
Number of dither patterns	5	15	1
Maximum scan area (inches)	8.5 x 11.5 in.	8.5 x 14 in.	11.5 x 17 in.
Interface	GPIB via NuBus	SCSI	SCSI
Bundled software	ChromaScan	ImageStudio	ImageMaster, ImageStudio plug-in, SuperPaint
Software implementation			
Application	yes	no	yes
DA	no	no	no
Plug-in	no	yes	yes
Scan to disk	no	yes	yes
Preview zoom	no	no	yes
Cropping	yes	yes	yes
Resizing capability	yes	3 – 800%	10 – 200%
Zoom edit	no	yes	yes
Gray-scale editing	no	yes	yes
Brightness/contrast controls	yes	yes	yes – automatic
File formats			
EPS	no	yes	no
Paint	no	yes	yes
PICT	no	yes	yes
PICT2	yes	yes	no
RIFF	no	yes	no
TIFF	no	yes	yes
TIFF compressed	no	no	no
Weight (pounds)	15 lb	18 lb	95 lb
Controls on scanner	none	none	none
PC compatibility	yes	yes	no
Threshold control	hardware	software	software
Warranty	90 days	1 year	90 days
Manufacturer	Sharp Electronics Sharp Plaza Mahwah, NJ 07430 (800) 237-4277 (201) 529-9500	UMAX Technologies 2352 Walsh Ave. Santa Clara, CA 95051 (800) 562-0311 (408) 982-0771	Varityper 11 Mt. Pleasant Ave. East Hanover, NJ 07936 (800) 631-8134 (201) 887-8000

*Price includes options.
†Included in system price.

Table 3: Features of Overhead Scanners
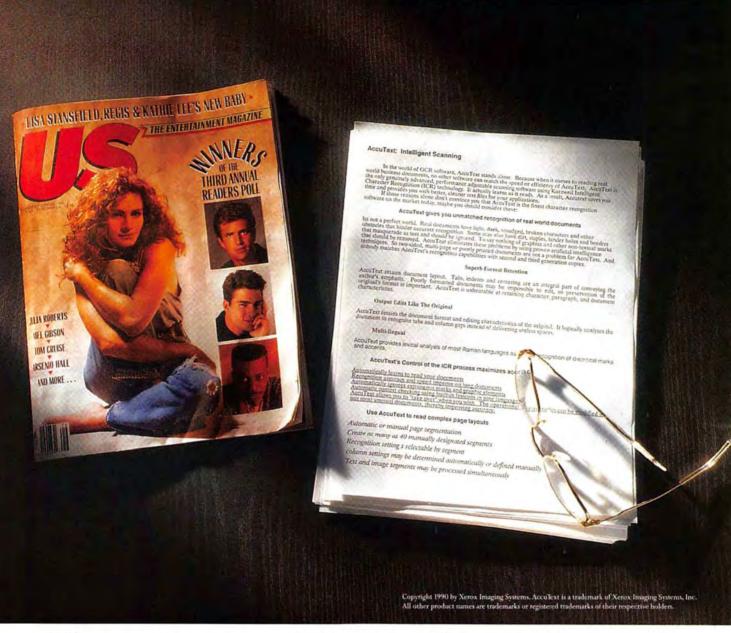
	Chinon DS-3000	Mirror VS300	Truvel TZ-3
Mouse rating	🐭🐭🐭½	🐭🐭🐭½	🐭🐭🐭🐭½
List price	$895	$797	$7,785
Comments	Poor resolvability. Good OCR. Ambient lighting is troublesome. Inexpensive but slow.	Poor resolvability. Nice software bundle. Ambient lighting is troublesome. Inexpensive but slow.	Highest resolution of all. Best resolvability, halftone and gray recognition. Uneven illumination at edges. Scans only to RAM.*
Automatic document feeder	no	no	no
System requirements	1-MB Mac Plus	1-MB Mac 512KE	2-MB Mac Plus
True resolution	300 dpi	300 dpi	75 – 900-dpi variable zoom
Other resolution settings	75 – 300 dpi	75 – 300 dpi	NA
Pixel depths	1 bit	1 bit	1, 2, 4, and 8 bits
Engine manufacturer	Chinon	Chinon	Truvel
Scan modes			
Halftone (dither patterns)	yes	yes	yes
Gray-scale	no	no	yes
Color	no	no	no
Number of dither patterns	1	1	none
Maximum scan area (inches)	8.5 x 11.5 in.	8.5 x 11.5 in.	12 x 17 in.
Interface	SCSI converter or serial	serial or optional SCSI converter	SCSI converter
Bundled software	Chinon Scan	DeskPaint, Read It!, VisionScan	Photoshop plug-in, TruScan
Software implementation			
Application	no	yes	yes
DA	yes	yes	no
Plug-in	no	no	yes
Scan to disk	yes	yes	no
Preview zoom	no	no	no
Cropping	no	yes	yes
Resizing capability	no	yes	17 – 300%
Zoom edit	no	yes	no
Gray-scale editing	NA	NA	no
Brightness/contrast controls	contrast only	contrast only	yes
File formats			
EPS	no	yes	no
Paint	yes	yes	yes
PICT	yes	yes	yes
PICT2	no	no	no
RIFF	no	no	no
TIFF	yes	yes	yes
TIFF compressed	yes	yes	no
Weight (pounds)	8 lb	8 lb	38 lb
Controls on scanner	threshold, remote scan	threshold, remote scan	none
PC compatibility	yes	yes	yes
Threshold control	software	hardware	software
Warranty	90 days	1 year	90 days
Manufacturer	Chinon America 660 Maple Ave. Torrance, CA 90503 (800) 441-0222 (213) 533-0274	Mirror Technologies 2644 Patton Road Roseville, MN 55113 (800) 654-5294 (612) 633-4450	Truvel 8943 Fullbright Ave. Chatsworth, CA 91311 (818) 407-1031

*Scan to disk can be accomplished with an optional Truvel Image Buffer ($5,495).

Table 4: Features of Sheetfed Scanners

	Complete PC Page Scanner	Datacopy JetReader 220	DEST PC Scan 2000	Microtek MS-II
List price	$1,199	$1,995*	$1,395	$1,495
Comments	No preview. Single sheets only. Good for line art and halftones.	Wide sheets OK. Small sheets jam.	Single sheets only; multisheet feeder extra.	Feeder handles up to 50 sheets.
Automatic document feeder	no	yes	optional, $695	yes
System requirements	2-MB Mac Plus	1-MB Mac Plus	1-MB Mac Plus	1-MB Mac Plus
True resolution	300 dpi	300 dpi	300 dpi	300 dpi
Other resolution settings	72, 300, 400 dpi	150, 300 dpi	38, 300, 600 dpi	75, 300 dpi
Pixel depths	1 bit	1 and 4 bits	1 and 8 bits	1 bit
Engine manufacturer	Mitsumi	Ricoh	DEST	Microtek
Scan modes				
Halftone (dither patterns)	yes	yes	yes	yes
Gray-scale	no	yes	yes	no
Color	no	no	no	no
Number of dither patterns	3	11	4	12
Maximum scan area (inches)	8.5 x 14 in.	8.5 x 14 in.	8.5 x 14 in.	8.5 x 14 in.
Interface	SCSI converter	SCSI converter	SCSI converter	SCSI converter
Bundled software	SmartScan	MacImage	Publish Pac	Microtek DA, SuperPaint
Software implementation				
Application	yes	yes	yes	yes
DA	no	no	no	yes
Plug-in	no	no	no	no
Scan to disk	no	yes	yes	yes
Preview zoom	no	yes	yes	no
Cropping	yes	no	yes	yes
Resizing capability	10 – 200%	any size	13 – 200%	25 – 100%
Zoom edit	yes	yes	yes	no
Gray-scale editing	no	no	no	no
Brightness/contrast controls	yes	yes	yes	yes
File formats				
EPS	yes	yes	yes	yes
Paint	yes	yes	yes	no
PICT	yes	yes	no	yes
PICT2	no	yes	no	no
RIFF	no	yes	yes	no
TIFF	yes	yes	yes	yes
TIFF compressed	no	yes	yes	no
Weight (pounds)	10 lb	14 lb	15 lb	14 lb
Controls on scanner	resolution, halftone, pattern image type, brightness, eject	density†	none	none
PC compatibility	yes	yes	yes	yes
Threshold control	none	software	software	software
Warranty	90 days	90 days	90 days	6 months
Manufacturer	Complete PC 1983 Concourse Drive San Jose, CA 95131 (800) 634-5558 (408) 434-0145	Xerox Imaging Systems 535 Oakmead Parkway Sunnyvale, CA 94086 (800) 248-6550 (408) 245-7900	DEST 1015 E. Brokaw San Jose, CA 95131 (408) 436-2700	Microtek Lab 680 Knox St. Torrance, CA 90502 (800) 654-4160 (213) 321-2121

*Price includes options.
†Not implemented.

Table 5: Features of Slide Scanners

	Barneyscan CIS•3515	Howtek Scanmaster 35/II	Nikon LS-3500
Mouse rating	🐭🐭🐭🐭	🐭🐭	🐭🐭🐭🐭½
List price	$9,495	$6,995	$9,995
Comments	Easiest to set up. Fastest scanning. Excellent software. Difficult focusing procedure.	Poor software. Slow scanning. Inaccurate colors.	Best resolution. Good automatic features. Powerful software, not for novices.
Resolution (pixels)	1,024 x 1,500	2,048 x 3,000	4,096 x 6,144
Calibration method	slide	card	auto
Focus method	manual	auto	auto
Interface	NuBus	GPIB	GPIB
Negative scan	no	yes	yes
Preprocessing			
Color preview	no	yes	yes
Cropping	yes	yes	yes
Input-resolution control	no	no	yes
Output-resolution control	yes	yes	yes
Exposure control	yes	yes	yes
Gamma adjustment	yes	yes	yes
Sharpening	no	yes	no
Postprocessing			
Scaling	yes	no	no
Resampling	yes	no	no
Sharpening	yes	no	no
Four-color separations	yes	no	yes
Print from application	yes (to PostScript printer)	yes (to Howtek Pixelmaster)	no
File formats			
Amiga IFF/ILBM	yes	no	yes
CompuServe GIF	yes	no	no
EPS	yes	yes	yes
MacPaint	yes	no	no
PICT2	yes	yes	yes
PIXAR	yes	no	no
RIFF	no	yes	no
Targa	yes	no	no
ThunderScan	yes	no	no
TIFF	yes	yes	yes
Warranty	90 days	90 days	1 year
Manufacturer	Barneyscan Corp. 1125 Atlantic Ave. Alameda, CA 94501 (415) 521-3388	Howtek 21 Park Ave. Hudson, NH 03051 (603) 882-5200	Nikon, Inc. 623 Stewart Ave. Garden City, NY 11530 (516) 222-0200

Table 6: Features of Hand-Held Scanners

	Complete PC Complete Half-Page Scanner/400	Logitech ScanMan Model 32	NCL ClearScan	Thunderware LightningScan
Mouse rating	♦♦♦½	♦♦♦½	♦♦♦	♦♦♦♦½
List price	$399	$499	$695	$495
Comments	Best resolution. True 400-dpi scans. Excellent OCR.	Hard to get decent dither. Removable internal termination in SCSI box.	Color. Software captures only 8-bit pixels.	Excellent software. Snap-on guide. Externally terminated SCSI box.
System requirements	1-MB Mac Plus	1-MB Mac Plus	1-MB Mac II, SE/30*	1-MB Mac Plus
Resolution	200, 300, 400 dpi	100, 200, 300, 400 dpi†	90 dpi	100, 200, 300, 400 dpi†
Scan width (inches)	4.1 in.	4 in.	3 in.	4.2 in.
Scan length (inches)	14 in.	limited only by RAM	5 in.	limited only by RAM
Pixel depths	1 bit§	5 bits	8 bits◊	5 bits
Scan-head manufacturer	Mitsumi	Omron	Mitsumi	Omron
Dimensions (L x W x H, inches)	3.25 x 5.75 x 1.5	5.3 x 5.5 x 1.4	5 x 4.6 x 1.7	5.25 x 6 x 1.25
SCSI-box dimensions (inches)	8.5 x 5.5 x 1.75	7.75 x 4.75 x 1.5	7.25 x 5 x 1.75	8.25 x 6.25 x 3.3
Removable SCSI termination	no	yes (internal)	no	yes (external)
Scanner controls	brightness, resolution, dither	brightness, resolution, mode	brightness	brightness, resolution, dither
Scanning software	SmartScan 1.5	ScanMan 2.0	ClearScan 1.04	ThunderWorks 1.0
Other bundled software	none	ScanMan DA 2.0	none	LightningScan DA 2.4
Scaling range	10 – 200%	none	30 – 100%	none
Image correction	brightness, contrast	none	brightness	brightness, contrast, filters
Color palettes	NA	NA	system, custom	NA
Dithers available	3	3	6 (user can edit)	3
File formats				
MacPaint	yes	yes	yes	yes
PICT	yes	yes	yes	yes
PS/EPS	yes	no	no	no
TIFF	yes	yes	yes	yes
TIFF compressed	no	no	no	yes
Warranty	2 years	1 year	1 year	90 days
Manufacturer	Complete PC 1983 Concourse Drive San Jose, CA 95131 (408) 434-0145	Logitech 6505 Kaiser Drive Fremont, CA 94555 (415) 795-8500	NCL America 1221 Innsbruck Drive Sunnyvale, CA 94089 (408) 734-1006	Thunderware, Inc. 21 Orinda Way Orinda, CA 94563 (415) 254-6581

*SE/30 requires 8-bit-color card/monitor.

†200 and 300 dpi are interpolated values.

§1 bit at press time, now 8 bits.

◊Scan head capable of 12 bits; 8-bit limit imposed by software.

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Have Mac,

Now that you can take it with you, which portable Mac should you take?

BY
JOHN
RIZZO

The first reaction is panic. An emergency call summons you to the New York office three days ahead of schedule, but you haven't finished the presentation. You still have to use statistics software to plot the data and need to import the results into the presentation package. Then your heartbeat slows to normal as you remember — you have a portable Mac.

Portables are the hottest things going in the world of personal computers, and Mac users now have plenty of options: Apple's own portable, third-party alternatives, and non-Mac machines that can't run Mac software but that do offer a broad range of options if all you need is a temporary storage place for text and data.

Product specs for portables tout the virtues of their screens, drives, battery lives, and more, but the most fundamental trade-off is a simple one: raw power versus net weight. How you settle the weight-versus-power trade-off depends on your needs.
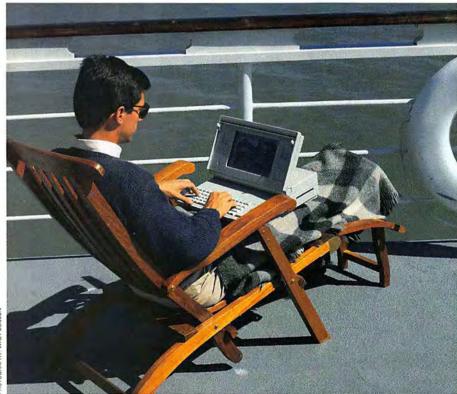
In other words, now that you *can* take it with you, what do you want to do with it? One person's portable is another's boat anchor. And what is a briefcase dynamo to some is a useless toy to others.

Most portables are used in one of two ways. Heavier, more powerful units are used as desktop computers that get moved around. Smaller, battery-powered portables tend to be used in

Will Travel
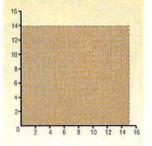
transit, letting you work between locations.

With the help of MacUser Labs, I tested four portable Macs — from Apple, Colby, Dynamac, and Outbound — to see how they fitted on the power-versus-portability scale (see Figure 1). We measured power in several ways: the processor speed, the degree of "Mac-ness," the amount of memory on-board, and the storage capabilities.

Apple Macintosh Portable

Configuration Tested:
1 megabyte of RAM, 40-megabyte hard-disk drive, floppy-disk drive, battery.
Weight: 15.9 pounds.
Battery Life: 10 – 16 hours.
List Price: $5,499.

Footprint in inches

In addition to running lab benchmarks, I took the units on the road — in trains, planes, and automobiles — to see where they fell on the portability scale. After all, portability isn't just a matter of weight — the shape, bulkiness, handles, and case are all factors in the answers to questions such as Will it fit under an airplane seat? Can you use it comfortably in a plane or a car seat? How easy is it to carry around all day?

The Lineup
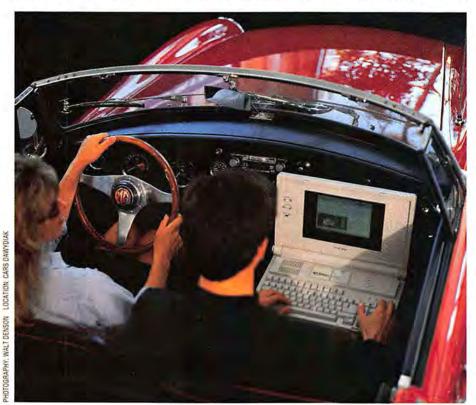
We began with the heavyweights in terms of power and heft: the SE/30 versions from Dynamac and Colby. Each machine is as powerful as a standard SE/30 and comes loaded with a 200-megabyte hard disk and 8 megabytes of RAM. The $9,995 Dynamac SE/30 comes with lots of extras, such as an internal Hayes fax modem, a built-in video card for external monitors, and a 64K hand-held Sharp Wizard electronic datebook with a Mac interface kit. (Dynamac also sells souped-up versions of Apple's Portable.) The $6,699 Colby SE/30 also comes with some extras, such as hardware monitor-adjustment controls and a security "key" that plugs into a connector, removal of which prevents use of the machine.

These two machines are meant to be used at the office and other locations, rather than in transit. The Dynamac SE/30 doesn't even use batteries, and batteries weren't available for the Colby SE/30 at the time of this review. But both units are quite a bit more portable than a standard Mac SE/30, as they weigh less, are much less bulky, and can fit under an airline seat.

Less powerful, but lighter and battery-operable, is Apple's Macintosh Portable, which has performance that ranges somewhere between that of an SE and that of a II (see "Mac to Go," November '89, page 96). It also has a sharp screen and a battery life of up to 16 hours, four to five times as long as that of any other portable. The Mac Portable became more attractive this summer when Apple cut $1,000 off its list price, which is now down to $4,799 for the floppy-disk-only model.

The 9.4-pound Outbound Laptop System (known as the Wallaby during its prerelease gestation period) is less powerful than Apple's portable in terms of performance, Mac compatibility, and storage capacity, but it is a true laptop (as opposed to what are officially called portables or, less charitably, luggables). Its price is $1,500 less than that of the Mac Portable, but it requires you (or, rather, your Outbound dealer) to take the ROMs from a Mac Plus or SE. (We tested the SE version.) The Outbound machine can be connected to the ROM-less Mac to make use of the Outbound and the SE screen simultaneously, as well as anything else to which the SE is connected, but the SE is useless when the Outbound is, well, outbound.

Moving further down the portability line, you may not need a Mac at all if you perform only basic tasks. Plenty of lightweight, inexpensive portables, laptops, and palmtops that run DOS and proprietary operating systems are

PHOTOGRAPHY: WALT DENSON   LOCATION: CARS DAWYDIAK

Colby SE/30

Configuration Tested: 8 megabytes of RAM, 180-megabyte hard-disk drive, floppy-disk drive, no battery, monochrome video card.
Weight: 16.6 pounds (with mouse).
Battery Life: 2.5 – 3 hours (claimed).
List Price: $10,188.

Footprint in inches

Portable Macs all have one thing in common: They are high-end and expensive. If you plan to work only with text, spreadsheets, and databases, you may want to consider the low-end portables available in the DOS world. I'm not talking about the $7,000 Compaqs but about the data buckets: You fill 'em up, carry 'em home, and empty 'em into your Mac.

Transferring and translating files between a DOS laptop and a Mac is a piece of cake with packages such as MacLinkPlus and LapLink-Mac, which come with all the cabling and software you need (see "PC to Mac and Back," October '89, page 143). Or, if your DOS laptop has a 3.5-inch floppy and your Mac has an FDHD SuperDrive, just pop the DOS floppy into your Mac and use the Apple File Exchange utility.

A data bucket doesn't even have to run the DOS operating system used in IBM PCs. You can use any laptop that can save its files in a generic file format that your Mac software can recognize, such as text only for word-processing files or tab-delimited for spreadsheet and database programs. You can send files through the laptop's serial port to the Mac, using a null-modem cable and terminal software on both machines.

The Best of the Buckets

Dozens of non-Mac portables and laptops are available to choose from, so I've narrowed the field down to five I can recommend to fit different briefcases and pocketbooks.

The Compaq LTE is a solidly built DOS portable (6 pounds) with a legible (if small) backlit electroluminescent LCD display, a 1.44-megabyte internal floppy, and 640K of RAM as standard equipment. A variety of options are available, including 384K of additional memory and an internal modem card. It's also the only unit here that has a hard-disk-drive option. It's a first-class piece of work, and its price is less than half that of Compaq's high-end DOS portables. A floppy-based LTE retails for $2,399, and the 20-megabyte hard-drive model is $2,999. Compaq Computer Corp., P.O. Box 692000, Houston, TX 77269-2000; (713) 370-0670.

If you're on a more modest budget, consider Toshiba's T1000SE, also about 6 pounds. For $1,699, you get 1 megabyte of RAM; a larger, crisper display than the LTE's; a more comfortable keyboard; and DOS burned into ROM (which frees up the single 1.44-megabyte drive for your data). Also available are 1- and 2-megabyte RAM cards. Drawbacks? For its lower price, the Toshiba isn't quite as rugged as the LTE and doesn't fit into a briefcase as nicely, but its worst failing is its two-hour battery life (half that of the LTE). Fortunately, additional battery packs are relatively inexpensive ($79) and are simple to swap. Toshiba America, 9740 Irvine Blvd., Irvine, CA 92718; (714) 583-3000.

There's nothing really extraordinary about Tandy's 1100FD laptop, but at a list price of only $999, perhaps Quaker simplicity was the intention. At 6.4 pounds, it weighs slightly more than the Compaq and Toshiba portables, and it has only a 720K floppy-disk drive. Its

supertwist screen isn't backlit, but it is perfectly readable with adequate lighting and it gives it a long battery life: five hours. As with the Toshiba T1000SE, DOS is burned into ROM. The Tandy laptop also sports a built-in word processor with spell checking, and simple database, spreadsheet, and scheduling software is included on-disk.

Tandy also makes a non-DOS, low-end unit called the WP-2, which at $350 almost makes you feel guilty about paying so little for it. The 3.1-pound, magazine-sized dedicated word processor comes complete with spelling checker and thesaurus, a telecommunications program, and a simple scheduler. The 80-character-by-8-line nonbacklit display can be a trifle hard on the eyes, particularly during long work sessions, and there is no floppy-disk drive. A $70, 32K RAM expansion will be mandatory for most serious users — a standard WP-2 can store only about ten pages of single-spaced text. Still, the WP-2 is a terrific value. Tandy Corp., 1800 One Tandy Center, Fort Worth, TX 76102; (817) 390-3700.

It's hard even to imagine the smaller-than-a-videocassette Poqet PC sitting on a desktop. At 1 pound, it's the smallest of the five units I recommend, but it is indeed a fully functional 640K DOS computer. It has a cramped yet perfectly functional keyboard and a small yet perfectly readable full-sized screen. You can use the $1,999 Poqet for 100 hours before its four AA batteries run out. A floppy-disk drive is optional, as are 512K RAM cards. If you absolutely must have a PC with you at all times and don't mind suffering cramped fingers, the Poqet is a good choice. Poqet Computer Corp., 650 N. Mary Ave., Sunnyvale, CA 94086; (408) 737-8100.

— Andy Ihnatko

For $2,399, the 6-pound Compaq LTE laptop gives you 640K of RAM and additional memory, hard-disk, and internal modem options — but no Macintosh compatibility.

available. See the "DOS Data Buckets" sidebar for a look at DOS and other non-Mac options.
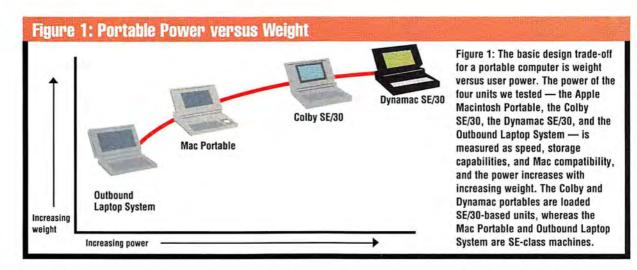
How Mac Is It?

If you do want your portable to be a Mac, consider just how Mac-like the offerings are. The Colby and Dynamac systems use actual SE/30 motherboards and can be connected to anything an SE/30 can. Apple's Mac Portable

is so Mac-like that it had the same minor software problems (due to new Apple ROM) as the Mac IIci had; it's compatible with many Mac software packages and most peripherals. (Two notable exceptions: The Mac Portable requires special RAM for memory upgrades, and it does not accept NuBus boards.)

The Outbound laptop, on the other hand, does not use a motherboard from Apple, and it gives up several things

Have Mac, Will Travel

Figure 1: Portable Power versus Weight

Increasing weight

Increasing power

- Outbound Laptop System
- Mac Portable
- Colby SE/30
- Dynamac SE/30

Figure 1: The basic design trade-off for a portable computer is weight versus user power. The power of the four units we tested — the Apple Macintosh Portable, the Colby SE/30, the Dynamac SE/30, and the Outbound Laptop System — is measured as speed, storage capabilities, and Mac compatibility, and the power increases with increasing weight. The Colby and Dynamac portables are loaded SE/30-based units, whereas the Mac Portable and Outbound Laptop System are SE-class machines.

Mac owners are used to, in return for portability. The first thing you notice is sound — or rather, the lack of it. Although the Outbound has a speaker, it's a feeble one at best, so its sounds are barely audible even with the Control Panel's speaker volume turned up as loud as it can go.

More substantially, the Outbound system doesn't use SCSI, the standard for connecting hard-disk drives in all Macs (including Mac Portables). This means you can use only a hard-disk drive supplied by Outbound, and you can't hook up a standard hard-disk drive for a data dump while you're on the road. Back at your desk, you can use your host SE's hard disk, although doing so impairs the Outbound machine's performance (see Figure 2).

Another Outbound compromise is that there is room for either a hard-disk drive or a floppy-disk drive but not for both. Easy access to both a floppy disk and a hard disk is something people take for granted on the desktop, and it can be invaluable on the road if you're working with large files. Although your first choice might be a hard

PHOTOGRAPHY: WALT DENSON

Outbound Laptop System

Configuration Tested: 1 megabyte of RAM, 40-megabyte hard-disk drive.
Weight: 9.4 pounds.
Battery Life: 1 – 3 hours.
List Price: $3,999.

Footprint in inches

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Figure 2: Portable Performance

Legend:
- DiskBasher!
- Dhrystone
- Whetstone
- Excel recalc
- MacDraw

X-axis categories: Mac Portable, Outbound Laptop System (docked), Outbound Laptop System (solo), Dynamac SE/30, Colby SE/30

Y-axis: Increasing speed (0–9). Mac SE Performance line at 1.
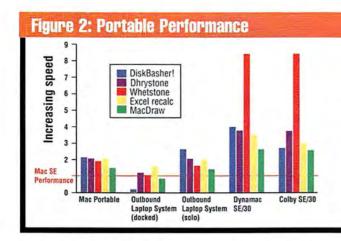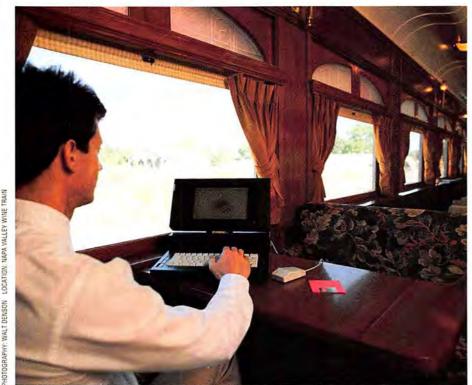
Figure 2: In MacUser Labs' CPU-performance tests, the two SE/30 portables were much faster than the Mac Portable and the Outbound laptop, which were both significantly faster than a stock SE. (The results shown here are normalized so that 1 represents the performance of a stock SE.) The Outbound portable's performance, particularly in the DiskBasher! hard-disk-speed trials, slowed significantly when the machine was docked with its host SE. The graph shows the data for the Outbound drive; results for the docked SE's drive were almost identical. Also not shown are results from the Outbound laptop's 4-megabyte RAM disk, which surprisingly did not significantly improve performance.

drive, don't forget that without a floppy drive or SCSI port, using a modem is the only way to input or output files while you're on the road.

If you choose the floppy drive, you can store a few files on an optional RAM disk, as the Outbound contains four slots for 20-nanosecond CMOS SIMMs designed for this purpose. A storage capacity of 4 megabytes (16 megabytes if you use 4-megabyte SIMMs) is certainly not as spacious as a hard disk, but it is sufficient for a System Folder and a few applications. However, although previous MacUser Labs tests have shown RAM disks attached via SCSI to be significantly faster than hard-disk storage

(see the SiliconDisk review, February '90, page 70), Outbound's RAM disk showed little gain in performance over its hard drive (see Figure 2).

The Outbound laptop also exhibits some software incompatibilities. For example, the Symantec Anti-Virus for Macintosh virus-detecting utility has some keyboard commands that don't work on the Outbound. Also uninvokable are operations, such as rebuilding the desktop, that require holding keys down during startup. The Startup cdev, the piece of Mac System software that lets you designate which volume will boot, does not work at all on the Outbound system.

PHOTOGRAPHY: WALT DENSON LOCATION: NAPA VALLEY WINE TRAIN
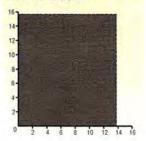
Dynamac SE/30

Configuration Tested:
8 megabytes of RAM, 200-megabyte hard-disk drive, floppy-disk drive, video card, internal modem, no battery.
Weight: 19.1 pounds (with mouse).
Battery Life: NA.
List Price: $12,695.
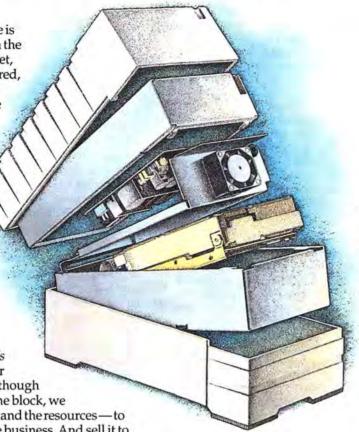
Footprint in inches

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Have Mac, Will Travel

Of Mice and Keyboards

Some of the Outbound machine's software problems have to do with the fact that it does not use the ADB (Apple Desktop Bus), Apple's method for connecting Macs to mice and keyboards since the SE. Some software, such as the Startup cdev, expects to see signals from the ADB and won't work without them.

Outbound's keyboard has the look and feel of a standard Apple keyboard with a little less tension. A notable difference is the Enter key, which is dangerously located next to the Delete key. The keyboard is cordless, using infrared light to communicate with the body of the machine, which can be several feet away. You can also fasten the keyboard to the machine, a convenient configuration when the Outbound is on your lap.

The Apple and Dynamac portables use a standard Apple unextended keyboard. The importance of standard keyboard layout is evident when you use the Colby portable, which has a keyboard that differs substantially from a Mac's. This can be confusing, especially when you find yourself hunting for keyboard command sequences that are second nature on a standard Mac. Another problem is that the keyboard rests flat, with no way to angle it forward (aside from putting a book, say, under the rear of the machine).
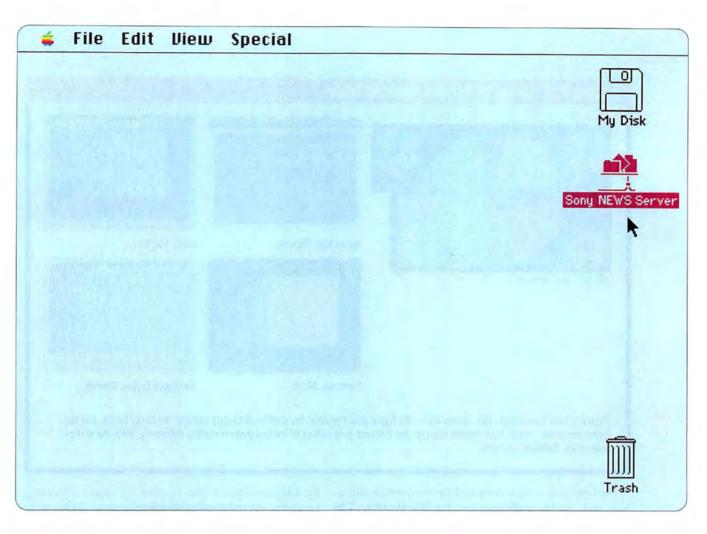
One thing I discovered about computing while traveling is that a mouse is useless in a vehicle; a trackball is far better suited to the mobile life-style. Both the Colby and the Dynamac portables use a standard mouse for operation. The Apple Portable can also use an ADB mouse, but it comes with one of the best trackballs I've seen, built to fit the average hand in a relaxed position. Diehard mouse fans who don't plan to work in a moving vehicle can replace the trackball with an optional numeric keypad ($69). (The Colby SE/30 comes with a numeric keypad.) Lefties can rearrange the keyboard to fit either the trackball or the keypad on the left side.

The Outbound keyboard comes equipped with a cursor-control device called an Isopoint. Located under the space bar, the Isopoint is meant to be operated with the thumbs, sliding left and right, back and forth, and down for a mouse click. I found it very awkward, especially for anything that required click and drag techniques. There are mouse lovers and there are trackball enthusiasts, but the Isopoint is a clumsy way to operate a Mac. (You can't plug an ADB mouse into the Outbound, although an optional proprietary mouse was to have been released this summer.)

Screen Stars

Like mice, not all portable screens are created equal. The screens of the Mac Portable and the Dynamac and Outbound portables are all 640 x 400 pixels, which is a bit wider than an SE screen. The Colby screen is smaller, at 512 x 342 pixels, but a 640-x-480-pixel screen was due by the end of summer. Beyond size, the screens have radical differences.

The Mac Portable's screen is the clearest and sharpest and has the best contrast and redraw speed. Unlike many PC-portable screens, the screen is not tinted: Blacks are very black on top of a light-gray background. Apple is using a new type of LCD (liquid-crystal display) screen called an active matrix. Its speed is due to a transistor lurking behind every single pixel. This screen makes the Mac Portable the best choice for giving presentations, as it affords the widest viewing angle (see Figure 4). A drawback is that it is not backlit, which means your surroundings must have lighting good enough to read in.

Figure 3: Screens at Optimal Viewing Angle

TEST PATTERNS BY LARRY PINA.

Apple Mac Portable   Colby SE/30

Dynamac SE/30   Outbound Laptop System

Figure 3: Left: From upper left, clockwise — the Apple Mac Portable, the Outbound Laptop System, the Colby SE/30, and the Dynamac SE/30. Right: Each screen displays the dithered gray values of the test pattern slightly differently. Note the orange tone of the Dynamac portable.

The Dynamac screen offers slightly less contrast, sharpness, and viewing angle than does the Mac Portable. The backlighting is orange, which surprisingly is not that hard to get used to. The worst problem is that the electroluminescent screen uses quite a bit of power and generates a good deal of heat, and the fan used to cool it down is *very* noisy. Dynamac is, however, working on a quieter fan.

The Colby and Outbound machines use a similar screen technology, called supertwist LCD, a reference to the wide angle through which the liquid-crystal molecules are rotated when a current is applied to them, turning them black in the process. The contrast of these two screens is much less than that of the Apple active-matrix and Dynamac electroluminescent displays. Although adequate for text, supertwist screens have a very slow redraw rate, so, for example, the cursor disappears when you move it and animation is blurred.

The Colby screen has the additional problem of an annoying flicker, which can be controlled to some degree with the brightness and contrast controls to the left of the screen. It also has a switch that inverts the black and white elements on-screen. The Apple and Outbound portables have software contrast controls in the Control Panel.

People who give presentations or use a portable as their main computer might want to hook their portable up to a large monitor. You can do this with all except the Outbound portable. The Mac Portable requires an adapter to connect monochrome monitors. Apple was not shipping the adapters at press time, but they are expected by early next year; several third-party adapters are available now, however. Colby sells a 19-inch monochrome monitor ($899) and a video card ($899 for monochrome, $1,099 for color) that lets its portable use both screens. Dynamac sells an E-Machines' 17-inch monitor ($995), but black-and-white and color video cards are already built in to let you run any monitor that can run from an Apple board. The Outbound laptop cannot be connected to an external monitor (when not docked in its home SE or Plus), but the company is working on an external LCD hookup.

The Power of Power

One of the Mac Portable's most useful features is its 10-to-16-hour battery life, which is due to a power-management system comprising low-power components, a Mitsubishi 5073 power-management chip, and software. At the heart of this system is the 2.7-pound removable lead-acid battery (which you don't have to discharge before recharging). The Outbound portable also uses a lead-acid battery, the same one used in common video camcorders. Outbound's battery weighs a pound less than Apple's but costs twice as much ($99) and lasts only about one-fifth as long. External rechargers are available for both batteries. The Dynamac portable does not have a battery, and Colby did not have one available at press time.

The Apple and Outbound portables both flash messages on-screen when battery power is low. When Apple's

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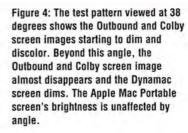
Have Mac, Will Travel

Apple Mac Portable

Colby SE/30

Figure 4: The test pattern viewed at 38 degrees shows the Outbound and Colby screen images starting to dim and discolor. Beyond this angle, the Outbound and Colby screen image almost disappears and the Dynamac screen dims. The Apple Mac Portable screen's brightness is unaffected by angle.

Dynamac SE/30

Outbound Laptop System

battery was bone dry, I could use the Portable when I plugged in the recharger (because it also works as an AC adapter). When the recharger is plugged in, the Mac Portable can recharge while in use. Outbound's machine, however, did not let me run it off the adapter/recharger until the battery had charged for almost half an hour.

The Apple and Outbound portables both have power-conserving software, but Apple's is more sophisticated. A Rest mode reduces the CPU's clock rate from 16 megahertz to 1 megahertz during a period of inactivity. This mode is completely transparent to users, and the clock rate returns to normal as soon as you touch the keyboard. There is also a Sleep mode, in which the CPU, screen, and hard-disk drive shut down. You can activate this mode through a command on the Finder's Special menu or the Sleep button in the Battery Power DA, or it can be invoked automatically via a Control Panel setting that tells the Portable to go to sleep after several minutes of inactivity. You can also set the hard disk to shut down before the screen does if it has been inactive for a user-specified period.

The Outbound does not have the equivalent of a Rest mode, but you can set the hard disk and backlighting to shut off after an idle interval. The screen stays on — using some power — but you can't read it at all without the backlighting. Unfortunately, you can't put the Outbound portable to sleep manually.

The manual Sleep command on the Mac Portable is useful, as you can put the Mac to sleep while an application is running, put the machine away for several hours without shutting down, and open it up exactly where you left it. This is possible because the Mac Portable uses low-power static RAM, which does not need to be continually refreshed the way ordinary DRAM (dynamic RAM) does. Unfortunately, static-RAM SIMMs cost about four times as much as DRAM SIMMs, so upgrading to the full 9 megabytes possible is costly — about $3,000. The Outbound portable uses DRAM that can be upgraded to 4 megabytes. (Both machines come standard with 1 megabyte.)

On the Road

After evaluating the portables in *MacUser*'s windowless lab, it was time for me to hit the road for some real-world tests. I carried the portables all over the country on almost every popular mode of transportation.

Starting with the object of America's love affair, the automobile, I used the portables during several car trips of varying lengths (as a passenger, of course). Here the Mac Portable worked out the best; the Colby and Dynamac portables have cigarette-lighter power adapters, so it was hard to operate a mouse on the dashboard. If Outbound's Isopoint is tricky to use on a desk, it's almost impossible to use on a curvy road. But Apple's trackball worked comfortably, and its battery outlasted both the car trip and my tolerance for having 15 pounds on my lap.

Believe it or not, the Mac Portable does fit on an airline tray table. I flew coach class on a 727-200, not one of Boeing's larger models, on Continental Airlines, not exactly known for the roomiest cabins. Lighting was good during the day, but marginal at night. The Mac Portable proved to be the ultimate airplane machine: Flying coast to coast, with a three-and-a-half-hour stopover in Denver, I had enough juice to work on the Portable the entire time with power to spare. I could have carried more batteries for the Outbound laptop, but I

Eyesore Vs. Eye Protection

As today's monitors get bigger and brighter, anti-glare filters become less of an option and more of a necessity.

The right filter can combat eye fatigue, help eliminate headaches, even reduce overall body stress.

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In fact, most filters look like they belong to someone else's system.

The fit is sloppy. The colors don't match. The materials are different.

Kensington has a different idea.

Instead of making a filter that will fit on any monitor, we make filters that will only fit a *specific* monitor.

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It looks so much a part of the SE, you would think it was designed by the same people who designed the SE.

The styling is complementary. The color identical. Even the same material is used.

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Have Mac, Will Travel

Table 1: Features of Portable Computers

	Apple Macintosh Portable	Colby SE/30	Dynamac SE/30	Outbound Laptop System
Rating	♦♦♦♦½	♦♦♦½	♦♦♦♦	♦♦♦
Comments	Best screen. Good trackball. Longest battery life.	Hardware contrast and brightness controls. Mouse only.	High-end. Mouse only.	Lightest portable. No SCSI or ADB. Difficult-to-use cursor control.
Base prices	floppy only, $4,799 floppy and 40-MB hard disk, $5,499	floppy only, $6,699	floppy, 40-MB hard drive, fax modem, video cards, and Sharp Wizard, $9,995†	floppy only, $2,999* 40-MB hard drive only, $3,999*
RAM for base price	1 MB	1 MB	5 MB	1 MB
Maximum RAM	9 MB	32 MB	32 MB	4 MB
Processor	16-MHz 68000	16-MHz 68030	16-MHz 68030	16-MHz 68000
Math coprocessor	none	16-MHz 68882	16-MHz 68882	none
Screen type	active matrix	supertwist	electroluminescent	supertwist
Screen attributes	good contrast and refresh speed, wide viewing angle, not backlit	slow refresh, some flicker	good contrast and refresh speed, orange backlighting	slow refresh, backlit
Weight (with hard drive)	15.9 pounds	16.6 pounds§	19.1 pounds§	9.4 pounds
Dimensions (folded — inches)	15.25 x 14 x 3◊	15.6 x 11.75 x 3.75	13.9 x 15.75 x 3.4	12.25 x 7.8 x 3.6
Battery life	10 – 16 hours	2.5 – 3 hours	NA	1 – 3 hours
Built-in modem	option	option	standard	no
Warranty	1 year	1 year	3 years	1 year
Manufacturer	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	Colby Systems Corp. 2991 Alexis Drive Palo Alto, CA 94304 (415) 941-9090	Dynamac Computer Products, Inc. The Anaconda Tower 555 17th St., Suite 1850 Denver, CO 80202 (800) 234-2349	Outbound Systems, Inc. 4840 Pearl E. Circle Boulder, CO 80301 (303) 786-9200

*Requires a Mac Plus or SE for operation.

†$3,500 off price for SE/30 trade-in.

§Battery not included in weight.

◊3 feet at center; tapers from 4 to 2 inches.

would have needed three extras and the 5.1 extra pounds would have made it as heavy as the Mac Portable.

I also used the portables on BART, the San Francisco Bay Area's subway. (As a native New Yorker, I wouldn't recommend trying this on the 8th Avenue Local.) The Mac Portable worked out fine here too, except for the absence of a tray table. Your thighs can start to go numb after a while, but a BART ride isn't long enough to make you worry much about that. Here the Outbound's Isopoint was more tolerable, as BART rarely makes sharp, sudden turns.

If your budget permits, don't skimp on the options. A built-in modem, for example, is one of the most useful things you can take on the road with you, saving you the time and hassle of setting up and toting an external modem. The Dynamac portable comes standard with an internal modem, and both the Apple and Colby models can use them. When you're traveling, a portable Mac loaded with hard-disk drive, floppy-disk drive, and modem can be worth its weight in subway tokens. 🖱

John Rizzo, _MacUser_'s technical editor and the author of more than 100 articles on Macintosh computing, thinks using a Mac on an airline tray table is better than eating the food.

The Bottom Line

Apple's **Macintosh Portable** straddles the borderline between the computer to use at different locations and the computer to use in transit. Its big high-quality screen, natural keyboard, fast performance, and full Mac attributes make it comfortable on the desktop as your main computer. And although it's bigger than a laptop, it works well on the road because of its long battery life. Although I'd like to see some additional features — such as backlighting that you can turn on for increased visibility and off to conserve battery life — Apple's Mac Portable still comes out the overall winner.

If power is your biggest concern and you're looking mainly for a desktop Mac that is easier to carry than an SE, I recommend the **Dynamac SE/30**. A good screen and keyboard combined with 68030 performance, lots of extras, and a three-year warranty make it a good high-end alternative.

The **Outbound Laptop System** is an almost-ran with potential. Its Mac incompatibilities could be forgiven if the price were lower, but it isn't cheap (especially considering that you need to donate another Mac's ROM to the cause). Although we can look forward to future improvements to the Outbound portable, it may make more sense to go with a DOS laptop if portability and price are your main concerns.

LASER LITE:

Apple's New Personal LaserWriters

You may have to wait for a low-priced Mac, but now there are two low-cost printers from Apple — and a half-dozen new penny-pinching competitors from other manufacturers.

You rarely look at the price of a Mac and say, Hey, that's a great deal! And you know why. Apple's well-paid legal department works hard to keep clones from appearing. With no direct competition, Apple hasn't been forced to drop Mac prices much, so it's kept prices high.

But the printer market is another story. Apple's recent cuts in the price of the LaserWriter IINT and NTX reflect the facts — Mac users don't have to buy printers from Apple any more. Now Apple has gone a step further in this direction, with a new line of classy, inexpensive printers: the Personal LaserWriters. They come in two variations: the SC ($1,999) and the NT ($3,299).

Apple's LaserWriter II printers share a common print engine; so do the Personal LaserWriters. The SC and NT models both use the Canon P-110, an advanced four-page-per-minute print engine first seen in the highly popular Hewlett-Packard LaserJet IIP.

BY HENRY BORTMAN

Laser Lite: Apple's New Personal LaserWriters

Figure 1: Apple's new Personal LaserWriters have flexible paper-handling capability. Unlike many other printers based on the same Canon P-110 4-page-per-minute engine, the Personal LaserWriters ship with a built-in 250-page paper cassette as standard equipment.
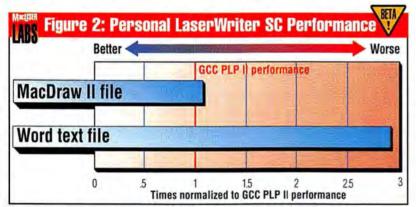
Figure 2: In our preliminary benchmark tests on a preproduction unit, the Personal LaserWriter SC performed slightly more slowly than the competing GCC PLP II when printing a 25-page text document and much more slowly on our QuickDraw test file. Times are normalized to PLP II performance. A value of 3, for example, indicates that the Personal LaserWriter SC performed at one-third the speed of the PLP II.

Apple has improved on the basic P-110 design, however, primarily in the area of paper handling. The Personal LaserWriter comes with the 250-page paper cassette that Hewlett-Packard only includes as a costly option (although even with the cassette added, the IIP is still priced competitively).

The Personal LaserWriter series also features flexible support for manual feeding and envelopes (see Figure 1). The manual-feed tray, which Apple calls a multipurpose tray, holds 5 envelopes. You can also buy a 15-envelope cassette for $89.

The difference between the Personal LaserWriter NT and the Personal LaserWriter SC printers is the controller board, which you can easily change (see Figure 3). Install an SC controller, and you've got an SC; install an NT controller, and you've got an NT. What's the difference? The SC is a QuickDraw printer that connects to a single Mac via the SCSI bus. The NT is an Adobe PostScript printer that can be connected to a LocalTalk network and shared by many users.

Affordable QuickDraw

When *MacUser* reviewed Apple's first SCSI-based LaserWriter, the IISC (see "Laser Fare," May '88, page 140), we said its best feature was that it could be upgraded to an NT or an NTX.

Not that QuickDraw printers are no good. In fact, with the type quality now available via ATM (Adobe Type Manager) and soon to be available with System 7's TrueType font technology, QuickDraw printers are becoming a more attractive alternative than ever before for users who don't need all of PostScript's graphics capabilities.

But it appears that the market agreed with our assessment of the original SC. Remember — a SCSI printer can't be networked or even shared. It's a single-user solution, and its $2,799 list price is too much for a single-user solution. Apple will be phasing out this white elephant when it introduces the Personal LaserWriter SC. It's a bit more palatable to shell out $1,999 for a single-user laser printer.

The SC controller board uses an 8-megahertz Motorola 68000 CPU with 1 megabyte of RAM and 64K of ROM. Sad to say, our benchmarks on a preproduction SC unit were significantly slower than those of the GCC PLP II, the only other SCSI-based 4-page-per-minute laser printer currently available. The PLP II just edged

Laser Lite: Apple's New Personal LaserWriters

Figure 3: You can transform the same Personal LaserWriter shell into either an SC (SCSI-based QuickDraw printer) or an NT (networked PostScript printer) simply by inserting the appropriate controller board.

Figure 4: Personal LaserWriter NT Performance

Better ← → Worse

- PageMaker file with TIFF
- Illustrator file
- MacDraw II file
- Word text file

IINT performance

0 .2 .4 .6 .8 1 1.2 1.4 1.6 1.8
Times normalized to LaserWriter IINT performance
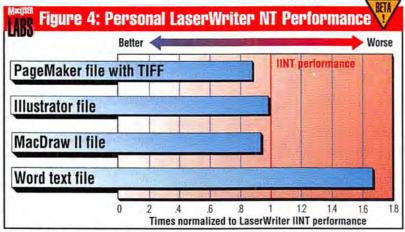
Figure 4: On most of our preliminary tests, the Personal LaserWriter NT, with its 4-page-per-minute engine, did slightly better than the LaserWriter IINT, which has an 8-page-per-minute engine. On the 25-page text document test, however, the Personal NT took more than one and a half times as long as the IINT. Times are normalized to the IINT. Values less than 1 indicate a better performance by the Personal NT.

Bargain-Basement PostScript

At first glance, the $3,299 Personal LaserWriter NT appears to perform better than a LaserWriter IINT(see Figure 4). It contains a 12-megahertz 68000 CPU with 2 megabytes of RAM and Adobe PostScript 51.8 in ROMs, mounted on removable SIMMs.

This version of Adobe's PostScript interpreter includes the quick type-rasterizing code originally developed for ATM. (ATM is an INIT that lets the Mac use Adobe Type 1 fonts to display superior-quality type on-screen.)

Despite the Personal LaserWriter NT's four-page-per-minute engine, most of our preliminary tests showed it performing a bit better than the eight-page-per-minute LaserWriter IINT.

How could this be? Well, in the LaserWriter IINT, the same 68000 processor that interprets PostScript code and imaged pages also has to spend up to 20 percent of its time managing communication with AppleTalk. The Personal NT controller board, on the other hand, uses a custom Peripheral Interface Controller chip, or PIC (see Figure 5), which offloads AppleTalk processing from the main CPU. This enables the 68000 to concentrate full-time on its main job of processing PostScript code. The PIC is a custom-designed integrated circuit based on a 6502, the processor every Apple II has used. This same custom PIC — a pair of them, actually — is also used in the Macintosh IIfx to control the serial ports.

When printing text pages, however, the Personal NT can bump into the ceiling imposed by its 4-page-per-minute print engine. The ATM type rasterizer enables the Personal NT to image text much more quickly than the rasterizer found in most older PostScript printers. In our preliminary run of the 25-page-text-file test, we found that the Personal NT's interpreter worked so well that it could have benefited from a faster print engine.

out the Personal SC's times on our 25-page-text-file test, and the Personal SC ran at only *one-third* the speed of the PLP II (see Figure 2) on our MacDraw II QuickDraw graphics test. Since the PLP II costs only $1,399, it appears to be a better value than Apple's new SC. (Bear in mind, however, that these are preliminary results, performed on a preproduction Personal LaserWriter SC; we'll offer a full report on a production SC and other QuickDraw printers in a future issue.)

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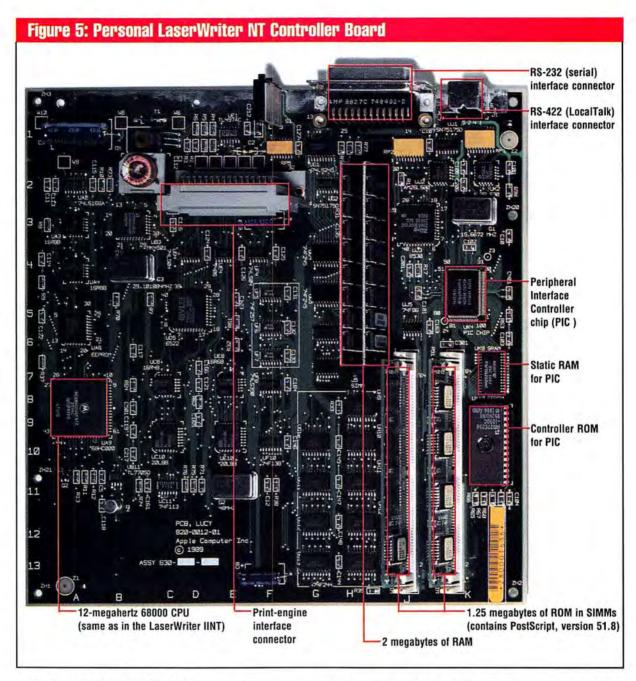
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Figure 5: Personal LaserWriter NT Controller Board

RS-232 (serial) interface connector

RS-422 (LocalTalk) interface connector

Peripheral Interface Controller chip (PIC)

Static RAM for PIC

Controller ROM for PIC

12-megahertz 68000 CPU (same as in the LaserWriter IINT)

Print-engine interface connector

2 megabytes of RAM

1.25 megabytes of ROM in SIMMs (contains PostScript, version 51.8)

The Low-End Market Heats Up

You won't be surprised to learn that Apple is not the only vendor introducing low-end printers. HP has already thrown its hat into the ring with a Mac version of the LaserJet IIP. Within a month of Apple's announcement of its new line, QMS, GCC, Qume, Abaton, Okidata, and Panasonic announced competing printers.
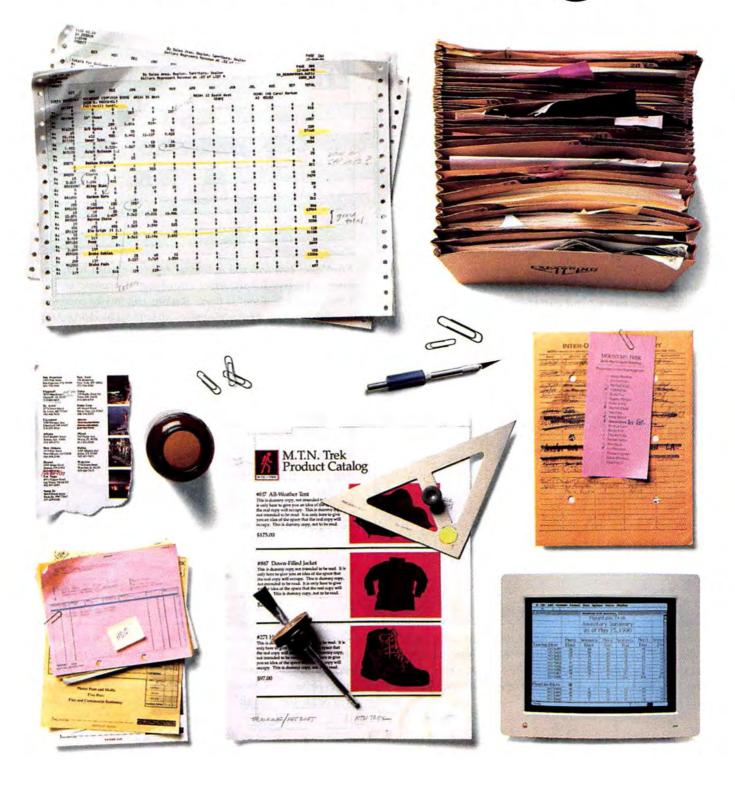
Everyone may wish for a IIfx and a LaserWriter IINTX, but not everyone can afford the $15,000 to $20,000 hit. The competition at the printer low end demonstrates that a significant market exists among people with limited budgets — one thing IBM executives seem to have understood far better than those at Apple.

If we can believe the rumors, we will soon see an affordable Mac CPU. When you can come away from a dealer with a System 7-capable Mac and a 300-dpi laser printer for less than the printer alone used to cost, you can expect to start seeing Macs — and Personal LaserWriters — on a lot more desktops. 🖳
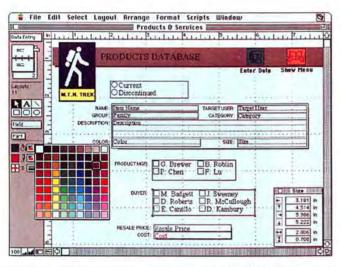
Henry Bortman is the MacUser NetWorkShop director, but his first love was PostScript printers — and the divorce is not yet final.
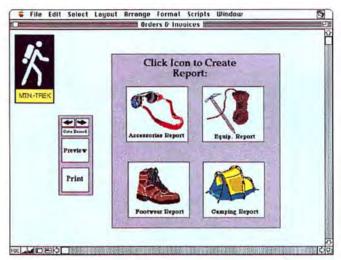
You can't always choose the data you have to manage.
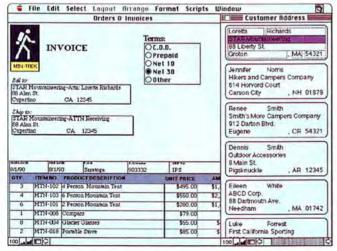
But you can choose how to manage it.

FileMaker® Pro software includes sophisticated drawing tools so you can create layouts in any form you choose. Pop-up menus, radio buttons and checkboxes make entering data fast and accurate. And a full palette of colors helps people vividly see your thoughts.

FileMaker Pro lets you automate repetitive tasks with "buttons." It's easy. Simply select any object or graphic on the screen and a "button" is born. Buttons can invoke commands, trigger scripts, and switch layouts—all without plodding through a programming language.
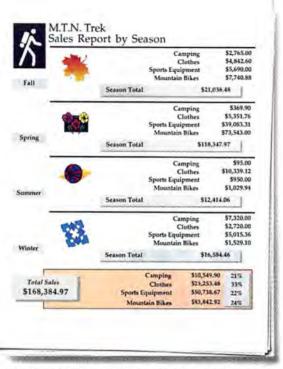
Multiple-file lookups let you relate data. For example, when you want your monthly invoices to each show customer address, FileMaker Pro looks at the customer name, searches the customer address file and fills in each address for you—all automatically.

You can share files on a network and control exactly who sees what on their screen. For example, if you want to share the hire date of an employee, but not his salary, simply check the appropriate boxes in the access dialog box. The hire date field will be shown. The salary field will not. Security is this simple.

And publish it.

Windows 3:
The PC to Be Your Best?

The Mac's monopoly on easy-to-use interfaces has officially ended, but the battle of the interfaces has just begun.

Mac users can often safely ignore what goes on in the tumult of the PC world. Not so with Microsoft's recent introduction of Windows 3.0. This new GUI (graphical user interface) for IBM PCs and compatible computers has ended the epoch in which you had to buy a Macintosh to get a widely used GUI.

The advent of Win3, as users call it, will produce wide-ranging consequences — both good and bad — for Macintosh users. Win3 is finding widespread acceptance among users and developers — including many leading Mac-software developers who are making their first forays out from under the Apple.

GUIs for PCs have been trotted out before, but before Win3, they failed to provide the quality, speed, or acceptance that was needed to compete with the Mac seriously. As an interface between the user and the operating system, Win3 still falls short of the Finder, Apple's main interface between the user and the System software. But Win3 fixes Win2's main problems: weak memory management, clunky user interface, slow performance, weak networking capabilities, cumbersome setup, and a paucity of business applications that fully exploit the potential of a graphical windowing environment.

BY FRED DAVIS AND LEE THÉ

Figure 1: Windows 3 represents an effort to give PCs an interface as capable and universal as that of the Macintosh. The Program Manager lets you run applications directly under Win3. Win3 provides accessories that are simple applications. The Windows Applications are separate products that exemplify dozens of applications that exploit the Windows interface. Many of them are also available for the Mac. This background is adapted from one of the desktop patterns you can choose in Win3's Control Panel.

Windows 3: The PC to Be Your Best?

Figure 2: The dialog boxes in Win3 use handsome 3-D-style control buttons. Also note how this graphical environment still can't save you entirely from having to deal with DOS's arcane pathing commands and device-naming conventions.

Unlike the Mac's Finder, which is highly integrated with the System and Mac hardware, Win3 is an application that runs on top of Microsoft DOS 3 or 4. While the Finder and System software are included with every Mac, you usually have to buy Win3 ($149) and DOS ($125 for DOS 3.3, the most common version) separately for your PC, although they are bundled with some applications and CPUs.

As a result, neither DOS nor Windows is a universal standard, although the vast majority of PC owners use various versions of DOS. The most popular alternatives include Microsoft OS/2, a distant cousin of DOS with mainframelike aspirations, and Microsoft Xenix, which is UNIX for PCs.

The Windows interface is now the same as that of Presentation Manager for Microsoft's OS/2 environment, which makes it easier for developers to create products for both environments. (Microsoft originally intended Windows to be a stopgap while OS/2 was perfected, but the tail has been far outselling the dog, even in earlier versions).

A Big Package

When you buy Win3, you get far more than the basic graphic environment. As with the original Macs and the original HyperCard release, the five-disk Win3 package comes with a potpourri of tools designed for productivity and to show off the future potential of the environment. The package includes Win3; hardware drivers for various computers, displays, printers, mice, and networks; rudimentary word-processing, color painting, and telecommunications application software; and some DA-like programs, such as Notepad, Macro Recorder, Cardfile, Calendar, Calculator, and Clock. You also get a run-time version of a HyperCard clone, Asymetrix ToolBook, as well as a ToolBook stack called Daybook, a personal-information manager. You even get two games: Reversi and Solitaire.

Of course, the Win3 package still floats or flops on the strength of the core environment—Win3 running on top

of DOS. The single biggest improvement over Win2 lies in memory management. Given a minimum platform of a PC with a hard disk and an Intel 286 processor or better, Win3 lets applications transcend DOS's previous 640K memory limit — providing easy access to up to 16 megabytes of RAM.

Running Win3 on a 286 is like running MultiFinder on a Mac Plus. To really exploit Win3, you need a 386 with several megabytes of RAM. (Most PCs are built with one of three main processors — the Intel 80286, 80386, or 80486 — each offering more speed and enhanced features, just as Macs based on Motorola 68000 CPU chips are outpowered by 68020 machines, which are surpassed by 68030s.) The payoff on a 386 is disk-based virtual memory, the ability to run applications in multiple windows, and true multitasking of standard DOS applications. On a network, Win3 lets you log on and off file servers and printers on the fly and manipulate print jobs that are queued up.

A 486-powered machine gives you the same features, only they're a lot faster. (The 486 is essentially a 386 chip with the equivalent of several support chips and a math processor built in.) Win3 doesn't run on 8088-powered PCs, such as the old IBM XT, however, nor does it support PCs without hard-disk drives.

Putting On a Good Interface

Win3 is more than just a pretty face. But Win3 does clothe its brains in beauty, starting with a slick setup program that automatically configures Win3 to your hardware, which is often a time-consuming task in the Byzantine world of PC memory architectures. Win3 has also made other cosmetic improvements in its user interface, such as 3-D buttons and scroll bars that appear to actually push in when you click on them with the mouse.

But beneath the glitz, Windows 3 still works awkwardly in comparison with the Macintosh. Instead of the functionality of the Macintosh Finder's desktop, where both programs and data can be accessed in a unified interface, Windows splits this capability into two entities: the
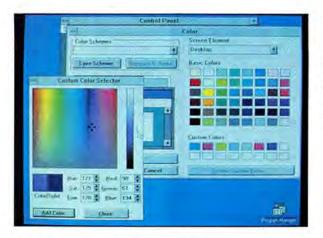
Figure 3: 640-x-480-pixel color displays are fairly inexpensive in the PC environment and therefore in common use. If you have a display with more colors, however, you can make use of Win3's provision for custom color selection.

File Manager and the Program Manager.

The Program Manager contains the icons for all the programs and "program groups," which roughly resemble folders of applications. You are able to access data-file icons and file-manipulation functions by starting the File Manager, a separate program that provides a directory tree of files and file folders.

As a result of this split in Window 3's personality, it's not possible for you to simply double-click on a document and expect the application to launch automatically. You can set up this automatic launch to happen with files that have prespecified file extensions, but it's not as easy

MacUSER LABS — Performance Comparison: Windows 3 versus the Mac

	Mac SE	286-based PS/2 Model 60
Excel recalculation (seconds)	29.2	15.1
Word-change test (seconds)	45.0	47.8
Graphic-redraw test (seconds)	181.3	NA*

* using Illustrator 88 (Mac) and Corel Draw (PC)

	Mac IIcx	386-based PS/2 Model 80
Excel recalculation (seconds)	8.8	4.5
Word-change test (seconds)	13.4	15.5
Graphic-redraw test (seconds)	54.0	72.1

	Mac IIfx	486-based Hawk II
Excel recalculation (seconds)	3.5	1.9
Word-change test (seconds)	4.6	5.0
Graphic-redraw test (seconds)	21.7	45.0

MacUser Labs tested the Macintosh System 6.04 and Windows 3.0 environments across three levels of hardware, using popular spreadsheet, word-processing, and graphics programs.

We chose three levels for hardware in our comparison: a 4-megabyte Mac SE versus a 1-megabyte IBM Model 60 with a 10-megahertz Intel 80286 processor; a 4-megabyte Mac IIcx versus an 8-megabyte IBM Model 80 with a 25-megahertz 80386; and a 4-megabyte Mac IIfx versus a 4-megabyte Club America Hawk II with a 33-megahertz 80486. The last machine is a PC clone with performance figures comparable to those of other 33-megahertz 80486 systems. All but the two low-end machines had math coprocessors. Our CPU-intensive tests should be generally valid for a wide variety of PC-compatible equipment with similar amounts of RAM and similar processor speed.

Microsoft software was used for both the spreadsheet and word-processing tests: Excel 2.2 on the Mac versus Excel 2.1 on the PC; and Word 4.0 on the Mac versus Word for Windows on the PC. For the graphics test, Adobe Illustrator 88 1.9.5 was used on the Mac, but since Illustrator doesn't run under Win3, the Labs chose Corel Draw 1.27 for the PC side of the test.

The Excel-recalculation test ran a loan-amortization schedule that calculates monthly payments on a $200,000 loan for a period of five years. The Word-change test performs 1,624 search-and replace-operations on a long document. For the graphic-redraw test, we did a preview of a 622K Illustrator 88 file. This was translated into a Corel Draw file for the PC tests.

Windows 3: The PC to Be Your Best?

Figure 4: How does Win3 software stack up? Asymetrix's ToolBook provides a costly but capable equivalent to HyperCard. As this custom application shows, you can produce commercial-quality stacks with ToolBook.

or dependable as using the Mac's Finder.

And despite the advances in Win3's interface, it still lacks many Mac GUI features, such as the trash can and folders (Win3's "program groups" are much less intuitive). The selection marquee is often unavailable, and filenames are restricted to DOS's character limit (eight-character filename plus three-character extension name).

Win3 also lacks anything as simple as the Mac's System Folder. To make system changes in Win3, you need to edit a variety of system files with names such as autoexec.bat, config.sys, system.ini, and win.ini. Worse yet, these files usually reside in different directories. (A directory is a list of files and folders at a particular hierarchical level. It's similar to the window that shows the files and folders when you open a hard disk [or other volume] or subfolder in the Mac's Finder).

And although Mac multimedia mavens MacroMind and Farallon are teaming up with Microsoft to provide better graphics and sound support in future versions of Windows, the Mac System software has better support for multimedia. (And although both Macs and PCs can be outfitted to provide excellent real-time graphics output, the Mac has much better sound playback capabilities than does a PC.)

HyperCard Does Windows?

HyperCard has given Mac users the ability to easily develop simple applications that PC users could only envy — until now. Several HyperCard-like programs have been announced for Win3, most notably Asymetrix's ToolBook ($395) and Spinnaker's Plus ($495). The latter program is available in a Mac version as well.

Spinnaker's Win3 and OS/2 versions of Plus were not shipping at press time. But one of Plus' key advantages will be the ability to run at least some of its applications on Macintosh, Windows, and OS/2 platforms, regardless of which environment the application was developed in. Plus will also have the edge on ToolBook, because of its ability to read many HyperCard stacks directly; these stacks can then be moved directly to the Windows or OS/2 versions. XCMDs and XFCNs are not directly compatible, but Plus can access similar external functions and commands through the use of Windows' DLLs (Dynamic Link Libraries). The Plus scripting language is similar to HyperTalk. Plus has some minuses, however. The primary one is that you need to buy a run-time license in order to distribute stacks, with the fee based on how many copies you distribute.

Only Win3 and OS/2 versions of ToolBook have been announced. ToolBook lacks Plus' direct HyperCard compatibility, but it has more features. It adds colors, resizable windows, the ability to combine objects into a group object with its own name and script, and a "hotword" function that turns any word in any text field into a button that can contain a script. ToolBook imitates HyperCard in both concept and function. The lack of direct HyperCard compatibility will hamper users, but it shouldn't be a huge barrier to proficient developers. ToolBook's programming language, OpenScript, resembles HyperTalk. The languages are so similar, in fact, that a utility for converting HyperCard stacks to Tool-Book "books" is being marketed by Heizer Software.
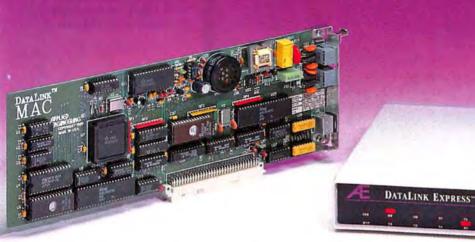
HyperCard runs much faster than does ToolBook (and probably faster than Plus will, when the Win3 version is released). HyperCard's fine data compression and search/sort algorithms are also much better than those of its PC counterparts. Furthermore, the well-developed Hyper-Card stack libraries and XCMDs have a big head start over the Win3 competition.

A Mixed Performance

We benchmarked the performance of typical tasks run on both the Windows 3 and Mac platforms, and the results were mixed. We pitted three comparable pairs of applications against each other: a word processor (Word on both platforms), a spreadsheet program (Excel on both platforms), and a graphics package (Illustrator 88 on the Mac and Corel Draw on the PC, because Illustrator was not available for Win3 at press time).

At every hardware price level, our preliminary results

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Windows 3: The PC to Be Your Best?

Figure 5: Win3's File Manager provides a fairly clear view of DOS's file structure. Such an interface may seem Byzantine to Mac users, but at least help is always a button-click away.

indicate that for graphics-related functions, the Mac is solidly ahead and that for math-intensive tasks, it's equally solidly behind. If you ignore price differences and match CPUs, the Mac operating system outperforms Win3.

The first test pitted a Mac SE against an equally humble 286-based PC, the IBM PS/2 Model 60. In an Excel recalculation comparison, the PC beat the Mac by a large margin — nearly 2 to 1 (29.2 seconds for the Mac versus 15.1 seconds for the PC) — while the Mac edged the PC in a Word test (45.0 versus 47.8 seconds).

Now compare the Mac IIcx against a 386 PC, the IBM PS/2 Model 80, the top of IBM's line of computers. In the graphics test, the Mac completed a redraw benchmark 33 percent faster than the PC did (54.0 seconds versus 72.1 seconds). The Mac also edged the PC in the Word test (13.4 versus 15.5 seconds) and again was beaten by the PC in the Excel recalculation (8.8 versus 4.5 seconds).

Finally, we brought out the big guns: the Mac IIfx against a 486 PC from a clone vendor (Club America, which uses Everex hardware in its Hawk II model) and a CPU with three times the number of transistors of the IIfx's 68030. The results paralleled those of the shoot-outs between the lower-powered platforms. The Mac's margin in the redraw test grew even larger (21.7 versus 45.0 seconds) and diminished in the Word test (4.6 versus 5.0 seconds). Although both machines performed much better in the Excel recalculation test, the Mac was trounced again on a percentage basis (3.5 versus 1.9 seconds).

In short, there is no definitive speed leader. While Macs are faster than Win3-equipped PCs of comparable power, PCs of comparable or lesser price sometimes beat the Mac.

Environmental Impact

What makes the Mac worth the premium? Every Mac uses basically the same operating system, so users aren't penalized as they upgrade hardware or change models. The Mac has better development tools, which, arguably, translates into more interesting software, and it has a full 32-bit operating system (including 32-bit color support) that affects the performance of certain functions.

And what is usually the PC's most indisputable trump card in any PC-versus-Mac debate — domination of the installed base — is a much weaker argument in the case of Win3: Win3 will run well only on less than 25 percent of all PCs, although it will probably be popular on new systems. (In fact, many PC-clone vendors have said they will preinstall Win3 on their new 386 systems.)

These systems can provide Mac-like functionality at a good price. A major-label 386SX system (with full 386 memory management but a slower bus interface) with a sharp color monitor, a 40-megabyte hard disk, 2 megabytes of RAM, and Win3 can be purchased for less than $3,000 if you shop carefully; you'd pay far more for a comparably equipped color Mac system.

Many industry analysts point to the Win3 silver lining for Apple: Win3 can help popularize the kind of interface that the Mac has been championing for years. This will ultimately lead to increased acceptance for the Mac at large corporate and government installations.

Apple's System 7 will further raise the benefits of the Mac side, but with the possible drawback of splitting the installed base into two groups — System 7 haves and have-nots — much as the PC side has been segmented into distinct classes of machines. And don't rule out the next release of OS/2, the high-performance operating system — declining chip prices have made its memory and processor requirements far more palatable.

Only one thing is certain: The interface situation will soon become even less clear. As the distinctions between Mac and PC interfaces overlap and blur, purchase decisions will become more complex — no longer based on immediately visible differences but on the myriad specific details of an overall hardware/software configuration weighed in the context of its environment. 🖾

Fred Davis and Lee Thé have had mirror-image professional involvement with Macs and PCs: Davis, a former *MacUser* editor-in-chief, is now director of *PC Magazine*'s product-testing laboratories. Thé, a former *PC Magazine* editor, is now a senior editor at *MacUser*.

IN SEARCH OF
The Ultimate Mac

We set out to create the single biggest, best, fastest Mac system ever configured, but we couldn't do it — instead, we came up with three of them!

BY
RIK MYSLEWSKI,
JEFF PITTELKAU, AND
THE MACUSER LABS
STAFF

Nowhere does *The Guinness Book of World Records* name the fastest, sleekest, and hottest Mac that money can buy — so MacUser Labs decided to create it. We assembled this ultimate system to settle, once and for all, the question Is the Mac-based workstation ready for prime time? The answer, we discovered, is a big fat Yes! The Mac can be configured so that it's as much a big leaguer as NeXT, Sun, Silicon Graphics — and then some. But you can't buy the ultimate Mac workstation from Apple — you have to build it yourself.

To assemble the most powerful Mac possible, we scoured the product universe for peripherals, boards, and other items at the top of their class — the fastest hard-disk drive, the crispest monitor, and the finest printer. And we added one more catch: All the products had to be unique. We weren't looking for products that edged out the competition on some obscure benchmark; each element of the ultimate system had to have some singular feature or advantage that made it an obvious choice. Money was no object — thank God — so we included products that aren't necessarily the best value (although many are). We weren't after the biggest bang for the buck, just the biggest bang.

As product suggestions came pouring in from our editors and technicians, we soon realized that we were really assembling two distinct configurations. The first, which became known as the UltiMac, is a practical — functional, if expensive — system. (The total price tag — while high — is in a range that's familiar to workstation and minicomputer users.) Although it's unlikely that anybody would need every element in the UltiMac, we made sure everything worked together — a task that proved more difficult than we'd anticipated. In fact, we found that the more high-end equipment you use, the less plug-and-play everything becomes. We tested the Ulti-Mac against the SE, IIcx, and IIfx. The winner? See Figure 1.

The second system is — we admit — totally self-indulgent. It (and its price tag) go beyond the ultimate

Mac into the realm of sheer fantasy: We didn't even try to make everything work together. We called this excursion into decadence the *Ultra*Mac. Whereas the UltiMac is a real bargain at around $100,000, the UltraMac costs more than a half-million bucks.

Window shopping for an ulti-BMW or an ultra-Lamborghini is all good fun, but it can be a bit frustrating to drive home in your Yugo. So we decided to add a third ultimate system, dedicated to the Yugo owner in all of us. We call this one the UltiPlus: a collection of no-cost tips, free or nearly free software, and some basic hardware
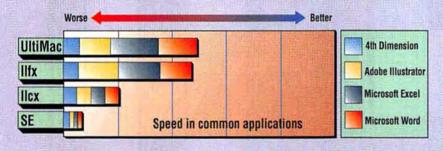
investments designed to improve every Mac, down to the humble Plus. Nothing fancy — just a few often-neglected tricks and reminders that can significantly improve your Mac's performance, literally in a matter of seconds.

Take a look at all three ultimate systems. They'll show you how to spend your upgrade dollars to make every penny count, no matter how many — or how few — pennies you can spare.
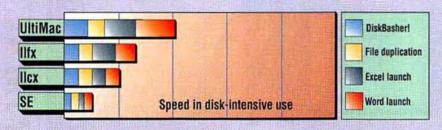
Rik Myslewski is a senior editor and Jeff Pittelkau is a project leader at MacUser Labs.

Figure 1: The UltiMac
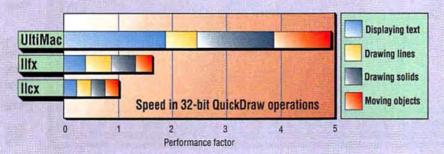
We timed the UltiMac — as well as the SE, IIcx, and IIfx — as they performed common applications, in disk-intensive use, and during 32-bit QuickDraw operations. The charts below compare each Mac with the IIcx.

Worse ◄——————————► Better

| UltiMac | IIfx | IIcx | SE |

Speed in common applications

- 4th Dimension
- Adobe Illustrator
- Microsoft Excel
- Microsoft Word

When sorting a large 4th Dimension database, the UltiMac is essentially as fast as a IIfx. We also previewed a large, complex Illustrator 88 document, recalculated a mortgage in Excel, and performed a global search and replace in Word. The IIfx beat the UltiMac in the Illustrator test, solely because its 13-inch Apple High-Resolution RGB Monitor has less than half as many pixels as the SuperMac monitor.

| UltiMac | IIfx | IIcx | SE |

Speed in disk-intensive use

- DiskBasher!
- File duplication
- Excel launch
- Word launch

The UltiMac now begins to come into its own, with times more than twice as fast as the IIcx's. MacUser Labs' DiskBasher! test of hard-disk throughput showed the UltiMac's advantage of storing applications and System software on a fast RAM disk, which avoids the SCSI bottleneck. Finder overhead prevents much speed improvement in duplicating a large folder, but in opening large Word and Excel documents, the UltiMac is the winner.

| UltiMac | IIfx | IIcx |

Speed in 32-bit QuickDraw operations

- Displaying text
- Drawing lines
- Drawing solids
- Moving objects

0 1 2 3 4 5

Performance factor

No contest. Despite the size of the SuperMac 19" Trinitron color monitor, the UltiMac's SuperMac Spectrum/24 PDQ Video Card performed 32-bit QuickDraw operations nearly five times as fast as Apple's Macintosh Display Card 8•24 in the IIcx and more than three times as fast as the 8•24 when used in the IIfx.

In Search of the Ultimate Mac

THE ULTIMAC

What's the fastest platform for running Mac, UNIX, and PC software? MacUser Labs creates the UltiMac.

As MacUser Labs proved in its recent report "Chasing the IIfx: Accelerators," (August '90, page 84), the Apple Macintosh IIfx ($8,969) is the fastest Mac yet. When you add a RAM disk, a high-speed hard-disk drive, and a QuickDraw accelerator, you blast the IIfx's performance into the ionosphere. Add more unique peripherals, and you have MacUser Labs' idea of the perfect Mac workstation — the UltiMac.

RAM

Newer Technology, Microtech International, and Computer Care all bundle Connectix's Maxima memory-management software ($129) with their 4-megabyte IIfx SIMMs. Eight of these SIMMs ($3,500 to $5,000 total at press time) equal 32 megabytes of RAM. We allocated 19 megabytes as a RAM disk, which reacts in nanoseconds (billionths of a second) rather than a hard-disk drive's milliseconds (thousandths of a second), so applications respond almost instantly.

Hard-Disk Drive

With 1 gigabyte (1,000 megabytes) of storage space, the MicroNet SB1000 ($7,995) is one of the biggest, fastest hard-disk drives available. Although FWB, Relax, and others also offer drives in this class, only the SB1000 can take advantage of MicroNet's forthcoming NuPORT SCSI DMA accelerator. Our preliminary tests show that the NuPORT can increase SCSI throughput 30 to 50 percent, which speeds up file retrieval and all other disk-intensive operations.

Color Display System

The SuperMac 19" Trinitron is a crystal-clear color monitor, and its matching Spectrum/24 PDQ Video Card ($9,199 for both) provides top-speed 32-bit QuickDraw performance while using only one precious NuBus slot. (The Radius QuickColor Graphics Engine and RasterOps QD Accelerator [$495] have similar performance capabilities, but both require two slots: one for the video card and one for the accelerator.)

Gray-Scale Display System

Because some applications are not suited for color, the versatile landscape/portrait Radius Pivot with 4-Bit Gray-Scale Card ($1,840) joins the SuperMac 19" Trinitron as the second window into the world of the UltiMac.

Printers

The Kodak XL7700 Digital Continuous Tone Printer ($24,895) produces 11-x-11-inch, 200-dpi color images as crisp and vivid as any we've seen. When you need high-resolution PostScript performance, the Varityper VT600P ($16,995) is the only true 600-dpi choice.

Backup Device

Tape drives can't match the convenience and speed of erasable magneto/optical disc drives. Only the single-drive MacinStor Erasable Optical Drive Model 880 ($7,995) and the dual-drive Model 1760 ($15,495) from Storage Dimensions can read and write all the common formats, as well as the emerging 1-gigabyte MaxOptix format. (As we went to press, FWB and Eltekon announced similar drives.)

CD-ROM Drive

Swapping CD-ROM discs is as annoying as swapping floppies. The Pioneer DRM-600 CD-ROM Minichanger ($1,395) solves this problem by keeping as many as six discs on the desktop at one time — nearly 4 gigabytes of on-line reference material or clip art.

Keyboard

DataDesk International's The Switchboard ($239.95) has a unique modular construction that lets you snap modules in — and out — that contain a trackball, function keys, programmable 3270 macro keys, and a numeric keypad, as well as the keyboard.

Modem

To keep in touch with less fortunate computers, the UltiMac is equipped with the Prometheus ProModem 9600M Plus ($995) — the only modem that offers the best of both telecommunications worlds: a 9,600-bps data modem with industry-leading error-correction and data-compression protocols, and a 9,600-bps send-and-receive fax modem.

Floppy Drive

Even the UltiMac must occasionally read files created by a lowly PC. The DaynaFILE ($905) with DOS Mounter ($89.95) reads, writes, and mounts 1.2-megabyte and 360-kilobyte 5.25-inch PC disks. (The Apple SuperDrive in the IIfx can handle 1.4-megabyte and 720K 3.5-inch PC disks.)
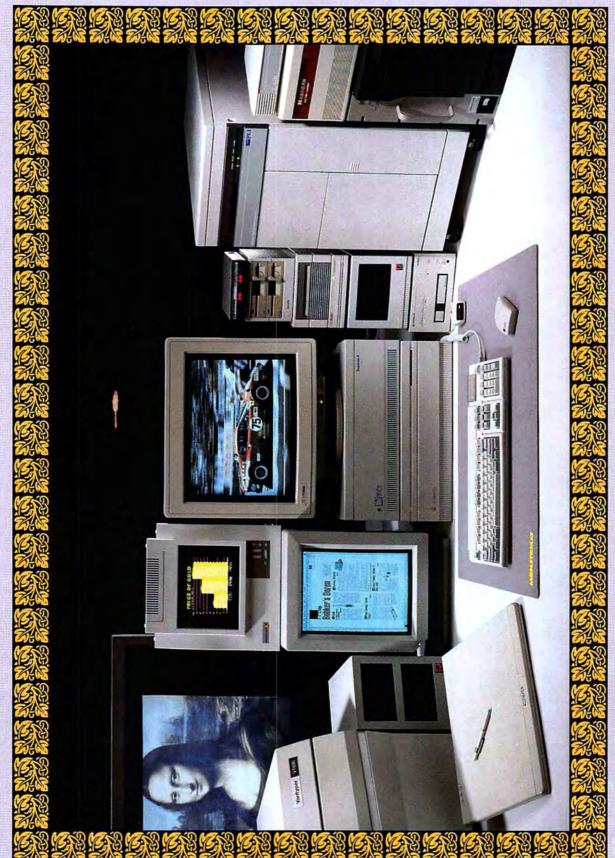
System Software

Apple's A/UX 2.0 ($2,395 with an Apple HD80SC 80-megabyte hard drive) is UNIX with a human — that is, Mac-like — face. Not only is it powerful and easy to use, but A/UX also lets you run Mac applications at the same time that you're exploring the world of UNIX. In addition to giving it A/UX, we've equipped the UltiMac with Insignia Solutions' SoftPC ($199), an elegant PC-emulator in software, for those times when you simply *must* use Lotus 1-2-3.

The Bottom Line

It adds up to blistering speed, UNIX and PC compatibility, state-of-the-art storage, practically perfect printers, and a hefty price tag: $113,352.

In Search of the Ultimate Mac

THE ULTRAMAC

Warning: You are now entering MacFantasyland, where money is no object and a system costs more than $500,000.

Nothing exceeds like excess. The UltiMac is arguably the ideal Mac workstation, but for a few measly hundred thousand dollars more, you can have the most luxurious Mac ever assembled. MacUser Labs presents this vision from hardware heaven, a veritable Macstravaganza of plenipotent peripherals — the *Ultra*Mac!

Storage

The MicroNet SBT2022 ($15,590) provides the lucky UltraMac user with more than 2 gigabytes of storage in one volume. MicroNet claims an astonishing 7.5-millisecond average access time for this giant. If that's too slow, you can use the PLI 512-Megabyte RAM Drive ($196,995), which has an enormous amount of high-speed memory that blazes past the mechanical limits of hard-drive technology. But even the RAM Drive is limited by the speed of the SCSI port. To break this final barrier, the 16-megabyte National Semiconductor NS8/16 memory-expansion board ($5,498) bypasses SCSI entirely and installs directly into a NuBus slot.

Display Systems

What good is it to have the world's most expensive Mac if you can't show it off? There's no better way for the UltraMac to strut its stuff than using two top-of-the-line presentation displays. The 37-inch Mitsubishi XC-3715C Color Monitor ($7,599) dominates any boardroom, and with the 64-color In Focus 480CX LCD panel ($5,495) and an overhead projector, you can impress a theaterfull. (While you're creating presentations, why not use the full Adobe Font Folio Disk? It's only $18,166.)

Backup

The UltiMac's 1-gigabyte optical drive can probably meet all your backup needs — but just in case it doesn't, the UltraMac includes a 36-gigabyte PLI Infinity Optical Jukebox ($79,000) for the absolute ultimate in secondary storage. This surprisingly compact unit can hold a staggering amount of information: If you fill each of its 56 erasable optical discs with text, you can save more than 80 tons of paper.

CD-ROM Drive

If 36 gigabytes of on-line information isn't enough, you can stuff the Kubik CD-ROM ($13,500) with 240 CD-ROM discs. Fully loaded, that's 156 gigabytes — try to transmit that much data by high-speed modem, and you'll wait until mid-September 2005 before you're done. The folks from Kubik also offer an equally capacious five-player CD-ROM Multiple Server ($25,000) for network use.

Cordless Input

The 12-x-12 inch Wacom SD-420L Cordless Digitizer ($795) uses a pressure-sensitive cordless stylus as a remarkably versatile input device — and because we now need another serial port, we've added the four-port Taniwha Systems Design CommCard ($450). (Wacom also offers an 18-x-25-inch cordless digitizing tablet, the SD-210L, for $3,195). To navigate around the ultimate mousepad (the $29 Limit Zero Monstermat), we use a cordless mouse: either the Basic Needs Mobius Cordless Mouse ($149.95) or the identical The Cordless Mouse from Practical Solutions ($149.95).

Multimedia

Although the Aapps DigiVideo Color ($995) with an on-board tuner is a quick-and-easy (and fun) way to watch TV on the UltraMac screen, we were torn between two choices for professional video production: the Truevision NuVista ($6,495) and the three-card, two-slot RasterOps ProVideo 32 Bundle ($5,195). For comparable quality in the audio world, the Digidesign Audiomedia Sound Processor ($1,344 with DECK recording/MIDI software) and the Digidesign MacProteus MIDI synthesizer ($995, plus $100 for EZ Vision software from Opcode Systems) can't be beat.

More Power

Why should the UltraMac owner be satisfied with just one CPU? For fun stuff such as structural analysis, circuit simulation, differential-equation solving, neural-net simulation, and artificial intelligence, the Levco Translink II parallel processor card is a bargain at $14,779 (including four 4-megabyte Levco T800 Transputer Modules). The Tektronix RP88B25 — also for custom applications only — weighs in at $17,995 with 32 megabytes of RAM and a 48-kilobyte cache. Its RISC coprocessor can crunch numbers three times faster than a husky Sun-4/260 workstation. Finally, to keep the overhead of A/UX from slowing down your game of Shufflepuck, we took the next logical step beyond a coprocessor. We added a Du Pont MacBLINTZ UNIX network co-*computer* ($19,500 for the 50-megahertz version with 32 megabytes of RAM).
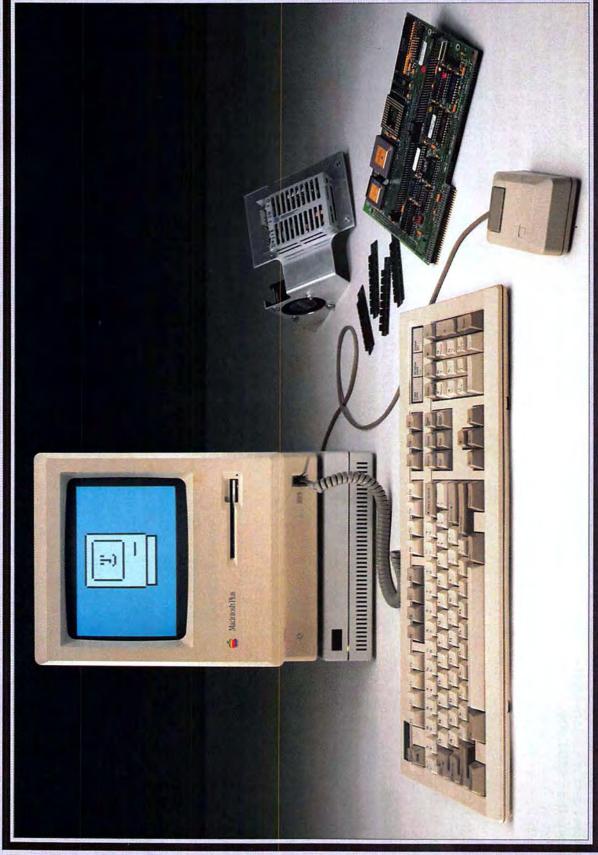
NuBus Expansion

Because the UltraMac is a fantasy system, don't expect all these components to work together. We've actually included more NuBus cards than will fit in a Mac IIfx — and one final component: a Second Wave Expanse II ($2,295) expansion chassis, which adds another eight NuBus slots.

The Bottom Line

Toto, I don't think we're in Cupertino anymore. The UltraMac contains stunning engineering at an equally stunning price: $537,812.

In Search of the Ultimate Mac

THE ULTIPLUS

Mac LABS

It doesn't cost a dime to coax better performance from any Mac. And for a few dollars more, your humble Mac Plus can blast past a IIci.

There's untapped power lurking within your Plus. Although you can improve Plus performance — or any Mac's muscle — without investing a cent, you can spend a few dollars on a couple of well-chosen enhancements or endow your Plus with an accelerator that boosts it into the big leagues.

Cashing In

Your Mac's Control Panel contains one of the most misunderstood features of the Mac system — the RAM Cache control. This control sets the amount of RAM that your Mac reserves for a disk cache. Set the RAM Cache control to 128K — the level that MacUser Labs testing has determined to be ideal. You've just improved the speed at which your Mac gets files from its disks.

Less Is More

Those little icons that march across the bottom of the screen as your Mac starts up represent INITs that load into the area of memory that's reserved for the System. INITs allow device- or application-specific information — the necessary interface information (*driver*) for a CD-ROM drive, for example — to be available at all times.

Despite their convenience, INITs consume memory, delay the startup process, and slow overall performance, so load only the INITs that you really need. Get a copy of a utility that lets you turn the INITs on and off (CE Software's Aask [part of MockPackage Plus Utilities, $49.95] or Microseeds Publishing's InitPicker, $69, both do the job), or just drag the INITs you don't need from your System Folder (don't delete an INIT — you'll be sorry when you need it later).

Simplify, Simplify

A Mac Plus doesn't need the most recent, most advanced version of System software. System Release 5.0, which includes System 4.2 (1987), will do just fine and uses less of the Plus' precious 1 megabyte of memory. In fact, our tests show that you can run Microsoft Word *and* Excel under Multi-Finder with System 4.2 — risky business with the current System 6.0.5 (and don't even think about trying it with the upcoming System 7, which will require 2 megabytes of RAM). And, speaking of MultiFinder, use it only when you must, because it also adds overhead and eats up memory.

More Is More

After you've finished simplifying your system — and getting rid of unnecessary fonts and DAs — you may want to buy some utility software. On the "don't miss" list are macromaking applications such as CE Software's QuicKeys ($99.95) or Affinity Microsystems' Tempo II Plus ($169.95). Either of these lets you perform common operations or print often-used text with one keystroke — a great time-saver.

A nifty little INIT from Bravo Technologies, SPAMM (System Program for Accelerated Macintosh Mathematics, $79) speeds up any calculations performed on your Plus or SE. Fifth Generation Systems' Suitcase II ($79) or ALSoft's MasterJuggler ($89.95) won't add speed, but they can make dealing with fonts and DAs much simpler and more versatile. Boomerang ($30, shareware) from zeta soft or Aladdin Systems' Shortcut ($79.95) can do the same for file handling.

Even More Is Even Better

If you still want better performance, bring your Plus into the Mac mainstream with a hard-disk drive and 4 megabytes of RAM. A myriad of vendors can help you with these purchases, but we have two bits of advice: First, spend a little more and buy high-speed RAM that you can use when you move up the Mac ladder. Second, don't buy a hard-disk drive that's smaller than 40 megabytes or has an average access time slower than 20 milliseconds. Any drive using the Quantum ProDrive 40S mechanism is a good bet.

Don't try to save money by scrimping on utility software for your hard-disk drive. Once it crashes, you'll wish

you had either Symantec's SUM II ($149.95) or Peter Norton Computing's Norton Utilities for the Macintosh ($129). To improve your Plus' hard-disk performance, get a copy of the public-domain masterpiece SCSI Accelerator. You can download it — and other great shareware — from *MacUser*'s Zmac on-line service, or get a copy from your user group. If you don't belong to a user group, check out BMUG (Berkeley Macintosh Users Group) or BCS (Boston Computer Society), the two best in the country. Also get a copy of Aladdin Systems' StuffIt Deluxe ($99.95), a widely used data-compression utility that makes the most of your hard-disk acreage.

Over the Top

Now that you're equipped with the necessities of Mac Plus life, think about buying some luxuries. The DataDesk Mac-101 keyboard ($194.95) gives you a numeric keypad and plenty of function keys to which you can assign macros. And last but by no means least, the Total Systems Gemini 030 25-megahertz accelerator ($1,695) enables your Plus to outperform a IIci, and the highly recommended GemKit ($200) upgrades your Plus' obsolete SCSI port.

The Bottom Line

Never give up on an old friend. Who needs an UltiMac when you've got an UltiPlus?

In Search of the Ultimate Mac

Directory

THE ULTIMAC

Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
(800) 538-9696
(408) 996-1010
❹ *Macintosh IIfx,* $8,969
A/UX 2.0, on 80-megabyte hard disk,
$2,395; on CD-ROM, $795; on floppies
or tape, $995

Computer Care
420 N. Fifth St.
Ford Centre, Suite 1180
Minneapolis, MN 55401
(800) 950-2273
(612) 371-0061
4-megabyte SIMMS, price subject to
change

Connectix Corp.
125 Constitution Drive
Menlo Park, CA 94025
(800) 950-5880
(415) 324-0727
Maxima, $129

DataDesk International
9314 Eton Ave.
Chatsworth, CA 91311
(800) 826-5398
(800) 592-9602 (in CA)
(818) 998-4200
❺ *The Switchboard,* $239.95

Dayna Communications, Inc.
50 S. Main St.
Fifth Floor
Salt Lake City, UT 84144
(801) 531-0600
❼ *DaynaFILE,* with 1.2-megabyte and
360K 5.25-inch drives, $905
DOS Mounter, $89.95

Eastman Kodak Company
Thermal Printing Systems
343 State St.

Rochester, NY 14650-0128
(800) 445-6325, ext. 110
⓫ *Kodak XL7700 Digital Continuous
Tone Printer,* color version, $24,895

Eltekon Technologies, Inc.
37493 Schoolcraft Road
Livonia, MI 48150
(313) 462-3155
MX2-1 GIG Magneto Optical Drive,
$11,000

FWB, Inc.
2040 Polk St., Suite 215
San Francisco, CA 94109
(415) 474-8055
hammer 1000, $8,495
hammerDisk 1000, $8,995

Insignia Solutions, Inc.
254 San Geronimo Way
Sunnyvale, CA 94086
(800) 848-7677
(408) 522-7600
SoftPC, $199

MicroNet Technology
20 Mason
Irvine, CA 92718
(714) 837-6033
❾ *MicroNet SB1000,* $7,995
NuPORT SCSI DMA, price not
announced at press time

Microtech International, Inc.
158 Commerce St.
East Haven, CT 06512
(800) 325-1895
(203) 468-6223
4-megabyte SIMMS, price subject to
change

Newer Technology
7803 E. Osie Road, Suite 105
Wichita, KS 67207
(800) 678-3726
(316) 685-4904
4-megabyte SIMMS, price subject to
change

Pioneer Communications of America
600 E. Crescent Ave.
Upper Saddle River, NJ 07458-1827
(800) 527-3766
(201) 327-6400
⓾ *DRM-600 CD-ROM Minichanger,*
$1,395 (with Mac interface kit)

Prometheus Products, Inc.
7225 S.W. Bonita Road
Tigard, OR 97223
(800) 477-3473
(503) 624-0571
❻ *ProModem 9600M Plus,*
$995

Radius Inc.
1710 Fortune Drive
San Jose, CA 95131
(800) 227-2795
(408) 434-1010
❷ *Radius Pivot,* $1,840 (with 4-bit
gray-scale card)
*Radius QuickColor Graphics Engine
(QD accelerator),* $795

RasterOps
2500 Walsh Ave.
Santa Clara, CA 95051
(800) 468-7600

(408) 562-4200
RasterOps QD Accelerator, $495 (no
RAM)

Relax Technology, Inc.
3101 Whipple Road, #22
Union City, CA 94587
(415) 471-6112
Relax 1.2-Gigabyte, $6,250 (internal)

Storage Dimensions, Inc.
2145 Hamilton Ave.
San Jose, CA 95125
(408) 879-0300
❽ *MacinStor Erasable Optical Drive,*
Model 880, $7,995; Model 1760,
$15,495

SuperMac Technology
485 Potrero Ave.
Sunnyvale, CA 94086
(408) 245-2202
❸ *SuperMac 19" Trinitron with
Spectrum/24 PDQ video card,* $9,199

Varityper
11 Mount Pleasant Ave.
East Hanover, NJ 07936
(800) 631-8134
(201) 887-8000
❶ *VT600P,* $16,995

THE ULTRAMAC

Aapps Corp.
756 N. Pastoria Ave.
Sunnyvale, CA 94086
(408) 735-8550
DigiVideo Color, $995

Adobe Systems
1585 Charleston Road, P.O. Box 7900
Mountain View, CA 94039-7900
(800) 344-8335
(415) 961-4400
Font Folio Disk, (80-megabyte hard-
disk drive with Adobe typeface pack-
ages up to #105; plus all others to #137
at 40-percent subscriber discount),
$18,166

Basic Needs
2342 Meyers Ave.
Escondido, CA 92025
(800) 633-3703
(619) 738-7020
⓲ *Mobius Cordless Mouse,* $149.95

Digidesign, Inc.
1360 Willow Road, Suite 101
Menlo Park, CA 94025
(800) 333-2137
(415) 688-0600
Audiomedia Sound Processor, $1,344
(includes DECK recording/MIDI soft-
ware)
MacProteus, $995 (plus $100 for EZ
Vision software [Opcode Systems])

E.I. du Pont de Nemours & Co., Inc.
Electronic Imaging Systems
P.O. Box 6099
Newark, DE 19714-6099
(800) 545-0847
MacBLITZ, $19,500 (50-megahertz version with 32 megabytes of RAM)

In Focus Systems
7770 S.W. Mohawk St.
Tualatin, OR 97062
(800) 327-7231
(503) 692-4968
⑮ *In Focus 480CX*, $5,495

Kubik Enterprises
18873 Allendale Ave.
Saratoga, CA 95070
(408) 867-0438
㉑ *Kubik CD-ROM*, $13,500
Kubik CD-ROM Multiple Server, $25,000

Levco
6181 Cornerstone Court E., Suite 101
San Diego, CA 92121
(619) 457-2011
Levco Translink II, $14,779 (Link II card with four 4-megabyte T800 transputer modules)

Limit Zero
380 Camino de Estrella, Suite 199
San Clemente, CA 92672
(714) 361-2661
⑰ *Monstermat*, $29

MicroNet Technology
20 Mason
Irvine, CA 92718
(714) 837-6033
⑬ *MicroNet SBT2022*, $15,590

Mitsubishi Electronics America, Inc.
991 Knox St.
Torrance, CA 90502
(800) 556-1234
(800) 441-2345 (in CA)
(213) 515-3993
⑫ *Mitsubishi XC-3715C Color Monitor*, $7,599

National Semiconductor Corp.
Computer Enhancement Group
2900 Semiconductor Drive,
M/S 25-155
Santa Clara, CA 95052-8090
(800) 538-8510
(408) 721-5020
NS8/16, $5,498

PLI
47421 Bayside Parkway
Fremont, CA 94538
(800) 288-8754
(415) 657-2211

⑲ *PLI Infinity Optical Jukebox*, $79,000
⑳ *PLI512-Megabyte RAM Drive*, $196,995

Practical Solutions, Inc.
1135 N. Jones Blvd.
Tucson, AZ 85716
(602) 322-6100
⑱ *The Cordless Mouse*, $149.95

RasterOps
2500 Walsh Ave.
Santa Clara, CA 95051
(800) 468-7600
(408) 562-4200
RasterOps ProVideo 32 Bundle, $5,195

Second Wave, Inc.
9430 Research Blvd.
Echelon II, Suite 260
Austin, TX 78759
(512) 343-9661
⑯ *Expanse II*, $2,295

Taniwha Systems Design
2206 Roosevelt Ave.
Berkeley, CA 94703

THE ULTIPLUS

Affinity Microsystems
1050 Walnut St., Suite 425
Boulder, CO 80302
(800) 367-6771
(303) 442-4840
Tempo II Plus, $149.95

Aladdin Systems
Deer Park Center 23A-171
Aptos, CA 95003
(408) 685-9175
Shortcut 1.01, $79.95
Stuffit Deluxe, $(99.95)

ALSoft, Inc.
P.O. Box 927
Spring, TX 77383-0927

(415) 540-5557
CommCard, $450

Tektronix, Inc.
Advance Technologies Division,
M/S 50-662
P.O. Box 500
Beaverton, OR 97077
(800) 835-9433, ext. 8800
(503) 627-7844
RP88B25, $17,995 (with 32 megabytes of RAM and 48K cache)

Truevision, Inc.
7340 Shadeland Station
Indianapolis, IN 46256-3925
(800) 858-8783
NuVista, $6,495 with 4 megabytes of RAM

Wacom, Inc.
W. 115 Century Road
Paramus, NJ 07652
(800) 922-6613
⑭ *Wacom SD-420L Cordless Digitizer*, (12 x 12 inches), $795
Wacom SD-210L Cordless Digitizer, (18 x 25 inches), $3,195

(713) 353-4090
MasterJuggler, $89.95

BMUG (Berkeley Macintosh Users Group)
1442A Walnut St., #62
Berkeley, CA 94709
(415) 549-2684

BCS (Boston Computer Society)
One Center Plaza
Boston, MA 02108
(617) 367-8080
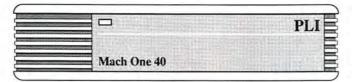
Bravo Technologies, Inc.
P.O. Box 10078
Berkeley, CA 94709-0078
(415) 841-8552
SPAMM, $79

CE Software
P.O. Box 65580
West Des Moines, IA 50265
(800) 523-7638
Aask (part of MockPackage Plus Utilities 4.4), $49.95
QuicKeys 1.2, $99.95

DataDesk International
9314 Eton Ave.
Chatsworth, CA 91311
(800) 826-5398
(800) 592-9602 (in CA)
(818) 998-4200
㉒ *Mac-101 Keyboard*, $194.95

Fifth Generation Systems
10049 N. Reiger Road
Baton Rouge, LA 70809
(800) 873-4384
(504) 291-7221
Suitcase II, $79

Microseeds Publishing
7030-B W. Hillsborough Ave.
Tampa, FL 33634
(813) 882-8635
InitPicker, $69

Peter Norton Computing
100 Wilshire Blvd., 9th Floor
Santa Monica, CA 90401
(800) 365-1010
(213) 319-2000
Norton Utilities for the Macintosh, $129

Public Domain
Dolf Starreveld
Department of Mathematics and
Computer Science
University of Amsterdam
Kruislaan 409
1098 SJ Amsterdam
The Netherlands
Phone: +31 20 592 5022
SCSI Accelerator v2.10, free from user groups and bulletin-board services

Symantec Corp.
10201 Torre Ave.
Cupertino, CA 95014
(408) 253-9600
SUM II, $149.95

Total Systems
99 W. Tenth Ave., Suite 333
Eugene, OR 97401
(800) 874-2288
(503) 345-7395
㉓ *Gemini 030/25 MHz*, $1,695
㉔ *GemKit*, $200

zeta soft
2425B Channing Way, Suite 492
Berkeley, CA 94704
(415) 658-7213
Boomerang 2.1, $30 (shareware)

A drive is a drive, is a drive... or is it?

Mach One Drives
PLI Breaks the 1ms Access Time Barrier

PLI's proprietary new technology sets new performance standards with less than 1 ms access time and 5MB data transfer rate. No other drive is faster or safer. The perfect accelerator for your graphics, network servers and multi-media applications.

See the Mach One at Macworld in Boston.

SuperFloppy - A New Generation in Floppy Disk Drives

The new SuperFloppy from PLI breaks the 800k barrier to give all Macintosh users access to high-capacity floppy disk technology. The SuperFloppy offers 1.44Mb capacity, 400k, 800k and IBM compatibility, high-speed and auto-eject floppy disk convenience for the MacPlus and up. The SuperFloppy also works well with SoftPC and AccessPC from Insignia Solutions.

- High-density formatting gives you more storage while maintaining the convenience and familiarity of floppy diskettes.

- Read and write IBM disks and files on your Macintosh without complicated hardware, networks and software.

- SCSI interface delivers high-speed data transfer and allows easy daisy chaining.

- Compatible with all SCSI-equipped Macintoshes

The Infinity 40 Turbo
45MB Removable Cartridge Drive

With PLI's Infinity 40 Turbo, 45MB removable drive, you get 12ms effective access times, unlimited storage, IBM compatibility and valuable software (including AME from Casady and Greene and The Best of BMUG shareware). You also get PLI's ex-perience and guaranteed high quality. The Infinity 40 Turbo is available as a single drive or a twin with another removable, or any 3.5" or half-height drive. It is perfect as a primary or secondary drive, for backup, archiving or software distribution.

A.M.E. INCLUDED AND NOW SHIPPING

- External address and termination switching

- New, 12ms effective access time with TurboCache

- Compatible with Mac, A/UX and DOS

- Reads DOS cartridges on your Macintosh

- Up to four year warranties available

600MB to 36 Gigabytes of Erasable Optical Storage

The PLI Rewritable Optical Disk Drive redefines high-capacity data storage. Now, you can store more than 600MB of data on a cartridge that is almost indestructable and weighs just a few ounces. Warranties on media go up to 25 years. Perfect for graphics, publishing, software distribution and backup.

A.M.E. INCLUDED AND NOW SHIPPING

- 573MB with a 65ms access time or 614MB with 75ms access

- High reliability, extended warranties available

- Compatible with Mac, A/UX and DOS.

- 36 Gigabyte Optical Jukebox also available

THE
RIGHT TOOLS
FOR THE WRITE JOB

*Turn your word processor into a
high-powered writing machine.*

N obody ever said that writing for a living was easy — especially if the masterpieces you turn out daily are press releases and presentations. If you've ever thought that your word processor, for all its talents, isn't making the job any easier, *MacUser* has a few solutions that go beyond spelling checkers and thesauruses.

The following three articles contain suggestions from professional writers and Mac experts who present their favorite applications and utilities for creating outlines and formats as well as improving organization. And in case you're *still* feeling uninspired, we've included a few products that will get your creative fires burning.

By Howard Bornstein
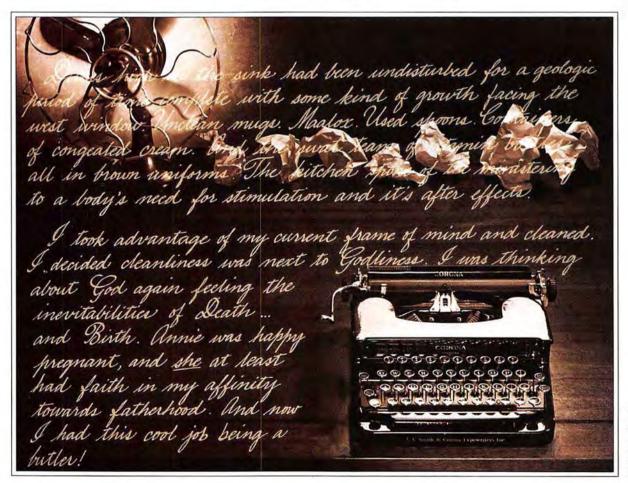
GOOF-PROOF WRITING

ll writers share the same problem: how to present information to their readers that's both professional and interesting. Misspelled words, poor turns of phrase, clichés, and bland adjectives — when you're working under deadline, they're hard to avoid and time-consuming to fix.

Fortunately, most word-processing programs are aimed precisely at professional writers. High-end word processors offer a vast array of features as well as extras such as spelling checkers, thesauruses, glossary

expanders, word counters, outliners, and index builders.

If your word processor doesn't have these extras, or if you don't like the way it implements them, you should be aware of third-party add-ons for customizing your writing environment.

A Hard Acta Follow

Presenting ideas in a well-organized manner is your first step. Some word processors include outliners, which can be excellent organizational tools. They let you "pre-process" your ideas to organize your articles and make them easy to follow. The outliner I like best is a stand-alone product called Acta Advantage, from Symmetry. Acta comes as a DA and as an application. You can use it with any word processor as well as several other programs.

Acta is a jewel of tight, functional design. You can manipulate the outline entirely from the keyboard or rearrange it with the mouse. You can paste material from other applications into its outline format as well as translate Acta outlines into MORE 3.0, MacWrite, WriteNow, Microsoft Works, and RTF (rich text formatting) files.

Safe Text
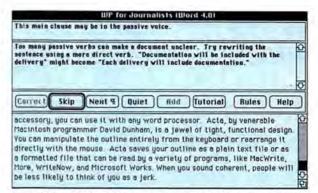
A good spelling checker is another tool that goes hand-in-mouse with writing. Today's spelling checkers are pretty smart: They catch most errors and suggest the correct spelling, and many allow you to make a user dictionary. Even though I find Microsoft Word's built-in spelling checker passable, I generally rely on Electronic Arts' Thunder II for practicing "safe text."

Thunder II checks spelling as you type and provides four dictionaries (including one that lists computer terms) as well as the ability to create special-subject dictionaries.

Thunder II can be your single largest quality-control aid — banishing typos and misspellings. A nice feature is that it can expand simple abbreviations into complex text strings and can be taught new words easily. If you've got a complicated word, such as a product name, that appears four or five times on a page, Thunder II lets you assign a shorthand set of letters that automatically gives you the full word.

Wordsmiths Synonymous

The thesaurus is probably second only to the dictionary as a writer's most commonly used reference. Whereas a dictionary defines words, a thesaurus can give you

Correct Grammar from Lifetree Software is an easy-to-use, fairly nonintrusive checker that identifies and allows you to correct grammar, style, spelling, and vocabulary errors. As with most of the other checkers, it includes standard readability indexes.

alternatives to the words you choose. Several electronic dictionaries and thesauruses are available, but Deneba Software's BigThesaurus is my favorite, because it also gives word definitions. Type or select a word in your document, and BigThesaurus provides a list of synonyms, related words, contrasted words, and antonyms. It's easy to track related words through the thesaurus while hunting for the right shade of meaning. BigThesaurus automatically replaces your original selection with one you choose. It's also one of the few word-processing programs that uses color nicely in its layout.

BigThesaurus helps you avoid the trap of writing boring sentences; instead you can produce sparkling, stimulating, and engrossing ones.
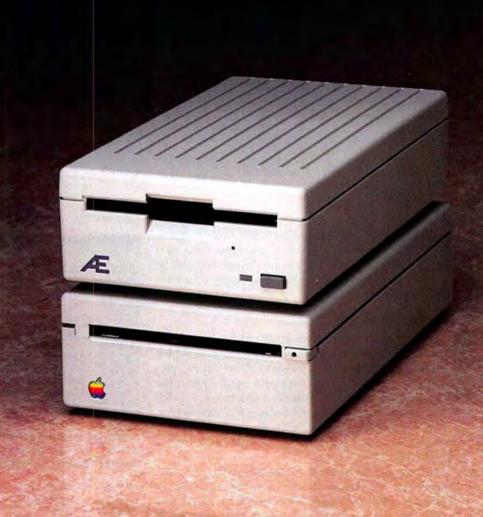
Everyone's a Critic

Another "checker" for writers is the grammar checker, which examines your writing and lets you know if you've violated any basic grammatical rules. I don't know any writer who considers grammar checkers worth the mylar they're printed on — perhaps this is because grammar checkers hit a little too close to home when they criticize a writer's style. A more likely reason is that grammar checkers are still too cumbersome to use. Grammar analysis is complex, and grammar checkers can't really understand the context of your writing, so they often flag perfectly acceptable passages as errors.

When I use a grammar checker, I use Lifetree Software's Correct Grammar, mainly because it lets me turn off some areas of checking. This eliminates most of the false error flags but still leaves enough checking to detect

How Does Our High Density Drive Stack Up Against Apple's?

Drive Manufacturer	APPLE	AE
FDHD (read/write MS-DOS, ProDOS)	yes	yes
Sony mechanism	yes	yes
Manual and auto eject	yes	yes
FCC certified design	yes	yes
Apple-standard footprint	yes	yes
ABS plastic case	yes	yes
Apple-standard platinum color	yes	yes
2-color read/write indicator	no	yes
Full daisy-chain compatibility	yes	yes
Custom molded DB-19 cable	yes	yes
800K capacity	yes	yes
1.44 MEG SuperDrive capacity	yes	yes
One year warranty	yes	yes
Worldwide dealer sales & support (over 2,000)	yes	yes
800K MSRP	**$429**	**$289**
SuperDrive MSRP	**$629**	**$339**

Everyone wants a second SuperDrive, but not everyone wants to pay the hefty price. Now there's an alternative. Applied Engineering's new 3.5" high density drive looks, feels, runs, reads, writes just like Apple's. It even smells like Apple's. But it costs a lot less. And with our exclusive 2-color read/write indicator you can actually tell what your drive is doing at any given moment. We even make a Mac II external drive adapter ($19), so you can add a second high density drive to your Mac II, IIx or IIfx. So how's our drive stack up against theirs? That's the bottom line.

Applied Engineering also makes a line of fax modems, memory cards, multi-function cards and other fine Macintosh peripherals. For ten years we've forged a reputation for exciting and innovative products, backed with the best

warranties and the best technical support in the business. Find out why.

Order today! To order or for more information, see your dealer or call (214) 241-6060 today, 9 am to 7 pm, 7 days. Or send check or money order to Applied Engineering. MasterCard, VISA and C.O.D. welcome. Texas residents add 7 1/4% sales tax. Add $10 outside U.S.A.

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The enhancement experts.

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P.O. Box 5100
Carrollton, TX 75011

Made IN THE USA

The Right Tools for the Write Job

some of my mistakes. And occasionally it's right.

Most grammar checkers also provide a couple of the standard readability indexes, which tell you how well educated the reader has to be to understand what you've written. For example, Correct Grammar says that you need at least an 11th-grade education to understand this article. It also says I use too many idioms. Go figure.

On-Line Reference

Unlike grammar checkers, on-line reference products don't check your work for you — they provide a guide to correct English style and usage. The AP Stylebook (Digital Learning Systems) is a DA that uses Associated Press style to answer vital questions such as when to spell out a number and how to refer correctly to the Queen of England.

Later this year, Microlytics hopes to release an electronic version of Strunk and White's classic *The Elements of Style*. It will be available as a stand-alone product and as a utility in some word-processing programs. Microlytics plans to link The Elements of Style to a grammar checker so that it can open automatically *to the proper section* when an error is flagged.

Mixing It Up

By adding an outliner, dictionary, thesaurus, spelling, or grammar checker to your word processor, you can mix and match to create your ideal word-processing environment. These tools won't improve your writing or reporting, but they'll certainly save you time and help you avoid embarrassing errors.

For more information on grammar and style checkers, see StartUp, June '90, page 59, for reviews of Grammatik

Although most word processors include a spelling checker, Electronic Arts' Thunder II takes the concept one step further. It flags errors as you write and includes several standard and personalized dictionaries. You can install Thunder into most applications.

Mac and Correct Grammar; and StartUp, August '90, page 59, for reviews of MacProof and RightWriter.

Mac writer Howard Bornstein kissed the ground when spelling checkers were invented. His book *Turn and Burn: The Authoritative Guide to Falcon* is published by COMPUTE! Books.

Directory

Deneba Software
3305 N.W. 74th Ave.
Miami, FL 33122
(305) 594-6965
BigThesaurus, $99.95
Spelling Coach Professional,
$195

Electronic Arts
800 Gateway Drive
San Mateo, CA 94404
(415) 571-7171
Thunder II, $79.95

Franklin Software
3511 N.E. 22nd Ave.
Fort Lauderdale, FL 33308
(305) 566-3511
Language Master, $99

Graham Software
8609 Ingalls Circle
Arvada, CO 80003
(303) 422-0757
Graham Speller, $44.95

Lexpertise
9 Exchange Place, Suite 900
Salt Lake City, UT 84111
(801) 350-9136
MacProof, $195

Lifetree Software
33 New Montgomery St.,
Suite 1260
San Francisco, CA 94105
(415) 541-7864
Correct Grammar, $79

Lundeen & Associates
Box 30038
Oakland, CA 94606
(800) 233-6851
WorksPlus Spell, $99.95

Microlytics
Two Tobey Village Office Park
Pittsford, NY 14534
(716) 248-9150
WordFinder, $59.95 (included
free with Microsoft Word)

Reference Software International
330 Townsend St., Suite 123
San Francisco, CA 94107
(415) 541-0222
Grammatik Mac, $99

RightSoft, Inc.
4545 Samuel St.
Sarasota, FL 34233
(813) 923-0333
RightWriter, $95

Sensible Software
335 E. Big Beaver, Suite 207
Troy, MI 48083
(313) 528-1950
Sensible Grammar, $99.95

Working Software
Box 1844
Santa Cruz, CA 95061-1844
(408) 423-5696
SpellsWell, $74.95
LookUp, $59.95

OUTLINERS
Aldus
411 First Ave. S.
Seattle, WA 98104-2871
(206) 628-2375
Persuasion, $495

Symmetry
8603 E. Royal Palm, Suite 110
Scottsdale, AZ 85258
(800) 624-2485
Acta Advantage, $129

ON-LINE REFERENCE
*For other products in this category,
see "CD-ROM Hit Parade," April '90,
page 160.*

Digital Learning Systems
Four Century Drive
Parsippany, NJ 07054
(201) 538-6640
AP Stylebook 1.0, $59.95

The Right Tools for the Write Job

By Nicholas Lavroff

SCREEN PLAYERS

One of the few types of creative writing that has its own category of Mac products is screen- and scriptwriting. But don't get the wrong idea — these tools aren't just for Hollywood. If you write copy for ads, business presentations, industry films, or interactive applications, you can take advantage of several products that can help you write better scripts. They may not win you an Oscar, but they'll make your work a lot easier.

Screenwriting has certain formatting conventions that

INTERIOR.   SURGICAL PREP AREA OUTSIDE O.R. 5 — DAY

The young intern Dr. William Kennedy scrubs his hands vigorously. The sound system suddenly pages him. Nurse Velma Raspberry holds the phone to his ear as Nurse Francine Quinn drys his hands held out and away from his body.

                    WILLIAM
Dr. Kennedy. (pause) RH Negative.
Why, did she loose alot of blood? Oh
my! Yes this is it. Can you prep
O.R. 7 for the procedure in 15
Minutes? And Jill, you'll have to
hold my mother.

Velma hangs up the phone and enters O.R. 5. Nurse Quinn prepares to tie the top ties to his surgical mask but before she does she plants a deliberate kiss square on hi

                    FRANCINE
Look Bill it gets lonely when people
die. You've known all along How I feel..

CLOSE-UP FRANCINE'S FACE

these tools can automate. You should print scripts in 12-point Courier (a carryover from the days of typewriters), for example, and there are also other conventions for setting out dialogue, scene descriptions, character names, and directions.

Of course, you can use a general-purpose word processor and format your pages to meet these requirements. *Script Formatting with Microsoft Word* by Larry Hussar (published by Canard Press) is an effective, low-cost guide to creating style sheets for film, live-tape TV, and three-camera TV. You can create style sheets or buy a companion disk.

Script Formatting's style sheets are very good. They let you automatically generate scene numbers and can even handle A pages (these pages are inserted into a script during revision and are identified by adding A, B, or C, to the previous page number). The book also shows you how to create a macro to break the dialogue correctly at the bottom of a page and continue it on the next page by adding *more* and *continued* where appropriate.

At $11.95 for the disk (the book also costs $11.95), Script Formatting is an economical first step if you have Word. Once you become more adept, or if you do much writing or editing, you may want to graduate to more-sophisticated products.
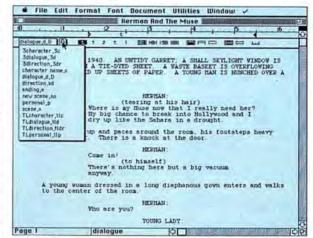
Another way to format scripts in Word is with Scriptor 1.5 from Screenplay Systems. Scriptor reformats a word-processing document in a variety of ways, according to your specifications: It automatically breaks pages in appropriate places, numbers pages and scenes, and automatically adds *more* and *continued* when dialogue runs on to subsequent pages.

ShowScape, from Lake Compuframes, is a high-level application that turns WordPerfect 1.0.2 into a tool for writing scripts, screenplays, and storyboards. ShowScape also lets you link files to your master script so you can print customized frame-by-frame instructions for each person involved.
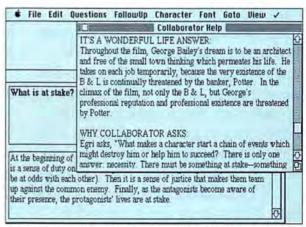
If you do much screenwriting, you might want to buy a dedicated word-processing program designed specifically for your needs. You'll still need a general word processor for other writing tasks, however.

Scriptwriter, from American Intelliware, has two specialized word-processing programs — scriptwriting and audiovisual applications — as well as a rudimentary general word processor. Scriptwriter also lets you use your Mac screen as a TelePrompTer.

The Script module uses icons to specify formats. As

American Intelliware's Scriptwriter is a three-module word processor that provides automatic formatting for screenplays and audiovisual scripts.

Collaborator, from Frankie, is an organizational tool that helps writers develop plot, action, and characters through a series of questions.

you write or edit your work, Scriptwriter renumbers pages and scenes, and automatically inserts *more* and *cont'd* if a page break falls in the middle of a soliloquy.

The Audio/Visual Dual Column module lets you compose the audio and video components of a television script separately, each in its own column. It synchronizes the parts automatically when you edit either column.

If you need more help in organizing your ideas than in formatting your finished script, look at Frankie's

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The Right Tools for the Write Job

Collaborator, a story-analysis application that assists you in keeping track of character and plot elements. By asking a series of 71 questions, Collaborator helps writers analyze subject matter. Collaborator is also a good beginner's course in dramaturgy. It provides sample answers by reference to the classic movie *It's a Wonderful Life* (a videotape of the film is included). It also draws examples from more recent films such as *Moonstruck* and *Midnight Run*.

You can export text from Collaborator into your word-processing program as ASCII text when it's time to start writing.

Nicholas Lavroff is a Seattle-based free-lance writer who is currently writing a screenplay.

Directory

American Intelliware Corp.
P.O. Box 6980
Torrance CA 90504
(213) 533-4040
Scriptwriter, $495

Frankie Corp.
3021 Airport Ave., Suite 112
Santa Monica, CA 90405
(213) 398-3771
Collaborator, $399

Lake Compuframes, Inc.
P.O. Box 890
Briarcliff Manor, NY 10510
(914) 941-1998
ShowScape, $299

Larry Hussar
Canard Press
11161-1/2 Acama St.
North Hollywood, CA 91602-3038
(818) 506-1045
Script Formatting with Microsoft Word, book, $11.95; disk, $11.95

Screenplay Systems, Inc.
150 E. Olive Ave., Suite 305
Burbank, CA 91502
(818) 843-8364
Scriptor 1.5, $299

All-Purpose Tools

Whatever kind of writing you do, these tools may not make the job any easier, but they can make it a lot more interesting.

The Comic Strip Factory
This application lets you create a variety of comic strips. It includes a database of parts for various characters and panel backgrounds and the ability to edit text in balloons.

The Comic Strip Factory
Foundation Publishing
5100 Eden Ave., Suite 307
Edina, MN 55436
(612) 925-6027
List Price: $69.95

IdeaFisher and MindLink
These two brainstorming products are a novel way to get started on any project. MindLink is a HyperCard stack that asks a series of questions to help you come up with ideas as well as formulate answers to problems. IdeaFisher is a massive collection of cross-referenced words, phrases, and questions that you can organize into a comprehensive project or story outline (see reviews, May '90, page 67).

IdeaFisher
Fisher Idea Systems
18881 Von Karman Ave.
Irvine, CA 92715
(714) 474-8111
List Price: $495

MindLink
MindLink, Inc.
Box 247
North Pomfret, VT 05053
(802) 457-2025
List Price: $499

The Phrase Thesaurus DA — Report Ideas
This DA is a thesaurus of 70,000 phrases that is designed to help you clarify the structure and content of a business or professional report. Before you start writing, you collect phrases on the Clipboard to create a basic outline.

The Phrase Thesaurus DA — Report Ideas
Intelligence Active Software
Business & Technology Center 6070
Macomb, IL 61455
(800) 344-0571
List Price: $79

Inside Information
Inside Information is a dictionary/thesaurus DA that classifies words into various linked categories and subcategories such as Domestic Life, Language, Nature, and Science and Technology. You can view categories in a variety of ways as well as keep records of selected words and definitions. It additionally includes a reverse dictionary, which can prove invaluable for making your writing more tightly structured and interesting.

Inside Information
Microlytics, Inc.
Two Tobey Village Office Park
Pittsford, NY 14534
(716) 248-9150
List Price: $119

QuickRhyme
This dictionary DA is for the would-be poet or songwriter. It provides rhymes and near-rhymes for a surprising number of words.

QuickRhyme
Apriori, Inc.
859 Hollywood Way
Suite 401
Burbank, CA 91510
(818) 955-9638
List Price: $74.95

IdeaFisher from Fisher Idea Systems is an elaborate program that lets you brainstorm a topic and then record, analyze, and evaluate your ideas.

Apriori's QuickRhyme is a dictionary DA that can spice up your prose as well as help with writing poetry and song lyrics.

By Daniel J. Rosenbaum
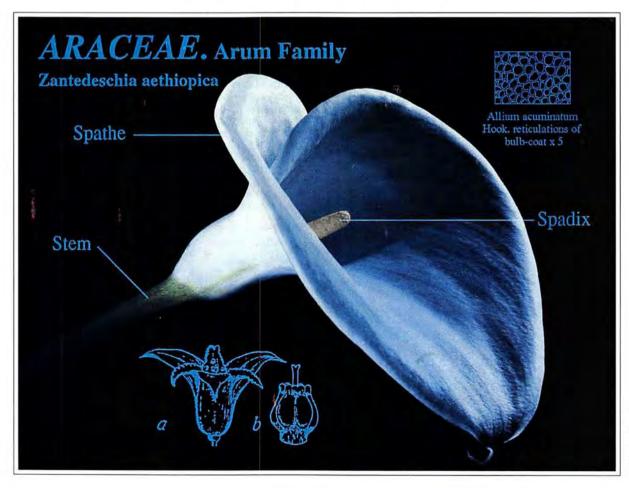
GETTING TECHNICAL

W riting a long document such as a manual, report, or dissertation has its own peculiar demands. You must juggle exotic and difficult spellings; special symbols and type fonts; and complex charts, tables, and graphics. You must also cope with the overriding task of organizing and coordinating a large body of information. So it's vital that you choose the right word processor.

All the high-end packages have their strengths: Microsoft Word 4.0 has style sheets that you can use as

ARACEAE. Arum Family

Zantedeschia aethiopica

Spathe

Allium acuminatum
Hook. reticulations of
bulb-coat x 5

Spadix

Stem

a   *b*

templates, which simplifies formatting — especially in a work group. I find that Word's nonintuitive outlining and indexing features can sometimes be inconvenient to use, however.

Paragon Concepts' Nisus lacks style sheets, but it has an extensive search capability that can operate on open or closed files. It also has a powerful macro language that can be used for a variety of complex tasks such as creating indexes and tables of contents.
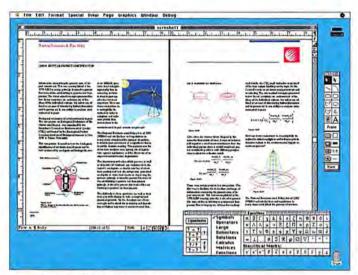
Ashton-Tate's FullWrite Professional combines outlining and word-processing functions with page-layout and drawing capabilities. However, as with Nisus, its many features translate into sluggish performance on a 1-megabyte Mac.

A new product — FrameMaker 2.0 from Frame Technology — promises to be a strong contender in attracting business and technical writers, especially those who work in group settings. FrameMaker 2.0 is a sophisticated package that includes a word processor, a page-layout program, a graphics generator, an equation editor, and book-building capabilities. Documents can be written, edited, illustrated, and laid out with the program, and they can be shared by multiple authors across a network. FrameMaker, due to ship in mid-1990, has hefty hardware requirements — 4 megabytes of RAM and, optimally, a full-page monitor. With a price close to $1,000, FrameMaker is probably not an option for free-lancers with a small budget.

Organizers

Organization and planning are critical in long documents, which means that outliners are a useful addition to any word-processing toolbox. If your document's organization is likely to change as the project progresses, check out Symantec's MORE 3.0, a comprehensive outliner and organizer, or the word processor MindWrite from Delta-Point. Both of these products let you move entire sections of text with only a few keystrokes. MindWrite integrates outlining and word processing with sophisticated search and select options. It also lets you write several versions of a paragraph or section and then select the one you want to print.

Another good organizational tool is a simple database for storing notes and small items of information. QuickDEX by Casady & Greene is a Rolodex-type DA that is intended for storing phone numbers, but you can also use it to file small items of information. You can access information by keying in any word that appears in

FrameMaker 2.0 includes a word processor, a page-layout program, an equation editor, and graphics.

the entry. The application PrintDEX lets you print and sort cards.

DAtabase, from Preferred Publishers, is a flat-file manager in a DA that handles pictures, text, and numbers. You can mark information to be printed or deleted; perform simple sorts (by date or name, for example); see a list of entries on-screen; and import records from numerous applications, such as QuickDEX. The number of records you can create is limited only by available disk space.
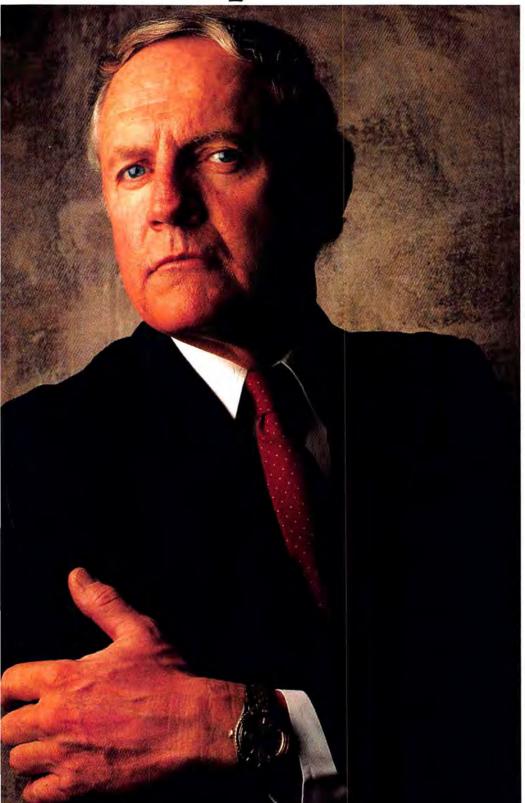
Little Extras

There are many smaller specialized tools that you can add to your toolbox to make your writing efforts a little easier.

If you're writing or editing technical documents, you'll probably need special characters that aren't provided in standard fonts, such as check boxes, decorative dingbats, and scientific symbols. KeyCap Fonts by Paperback Software International has characters that are useful for computer documentation. And Expressionist from Prescience is a DA that lets you create complex mathematical equations within applications.

If you still can't find the characters you need, consider Design Science's ParaFont, a utility that lets you customize an existing laser font, whether it's an entire typeface or a single character. You can add fractions, symbols, logos, small caps, or old-style numerals (with ascenders and descenders).

The Right Tools for the Write Job

Disk Management

File-search and disk-management utilities are invaluable for keeping track of your work. I think DiskTop 4.0, from CE Software, is the best file finder available (see review, June '90, page 76). You can search for a file in a myriad of ways: by size, date last modified, creator, file type, or part of its name. You can also move files around, create new folders, and rename documents. A similar product is DiskTools Plus from Electronic Arts, which comes with other DAs and applications such as an RPN (reverse Polish notation) calculator and a phone pad.

GOfer 2.0, from Microlytics, is a DA that supports wild-card searches. It can save and recall multiple "search sets" — criteria for how and where to look for text. You can specify what file types to exclude from a search.

On Location, from ON Technology, is a DA that creates indexes for multiple volumes. It allows users to search for filenames or text even if the volume isn't mounted on the desktop.

There is no simple way to keep track of editorial changes and revisions made on a computer, especially if more than one writer or editor is working on a project. If you want to see what changes have been made, you can use DocuComp 1.2, from Advanced Software, which lets you compare two versions of a word-processing document. The new document displays inserted text with an underline and moved text in boldface; the older document shows deleted and moved text with strikeout characters. You can also print a report that details all the revisions that have been made to a document.

Casady & Greene's Rolodex DA QuickDEX can work as an address book or as a means of filing information for later retrieval. The PrintDEX application allows you to sort and print your cards.

MarkUp by Mainstay lets network and remote users circulate and comment on a document. Any text or graphic changes can later be integrated into the text by the author or project leader.

Word Processors

For an analysis of word processors available for the Mac, see "The Complete Guide to Word Processing," February '90, page 94, and "The War of the Words," July '89, page 132.

Dan Rosenbaum, a *MacUser* contributing editor and author, has written documentation for hardware and software for DOS machines as well as the Mac.

Directory

Advanced Software
1095 E. Duane Ave., Suite 100
Sunnyvale, CA 94086
(408) 733-0745
DocuComp 1.2, $159.95

Ashton-Tate
6411 Guadalupe Mines Road
San Jose, CA 95120
(408) 268-2300
FullWrite Professional 1.1, $395

Casady & Greene, Inc.
Box 223779
Carmel, CA 93922
(408) 624-8716
QuickDEX, $60

CE Software
1854 Fuller Road, Box 65580
West Des Moines, IA 50265
(515) 224-1995
DiskTop 4.0, $99.95

DeltaPoint Inc.
200 Heritage Harbor, Suite G
Monterey, CA 93940
(408) 648-4000
MindWrite 2.2, $195; with Mind-Write Express, $295

Deneba Software
3305 N.W. 74th Ave.
Miami, FL 33122
(305) 594-6965
Comment, $99.95

Design Science
6475-B E. Pacific Coast Highway,
Suite 392
Long Beach CA 90803
(213) 433-0685
ParaFont, $99

Electronic Arts
800 Gateway Drive
San Mateo, CA 94404
(415) 571-7171
DiskTools Plus, $449.95

Frame Technology Corp.
1010 Rincon Circle
San Jose, CA 95131
(408) 433-3311
FrameMaker 2.0, $995

Microsoft Corp.
One Microsoft Way
Redmond, WA 98052
(206) 882-8080
Microsoft Word 4.0, $395

Paragon Concepts, Inc.
990 Highland Drive, Suite 312
Solana Beach, CA 92075
(800) 922-2993
Nisus 2.03, $395

WordPerfect Corp.
1555 Technology Drive
Orem, UT 84057
(801) 222-4000
WordPerfect 1.0.4 for the Macintosh, $395

Microlytics, Inc.
Two Tobey Village Office Park
Pittsford, NY 14534
(716) 248-9150
GOfer 2.0, $79.95

Mainstay
5211-B Derry Ave.
Agoura Hills, CA 91301
(818) 991-6540
MarkUp 1.03, two-user pack, $495;
five-user pack, $995; supplementary
personal version, $245

Paperback Software International
2830 Ninth St.
Berkeley, CA 94710
(415) 644-2116
KeyCap Fonts, $149.95
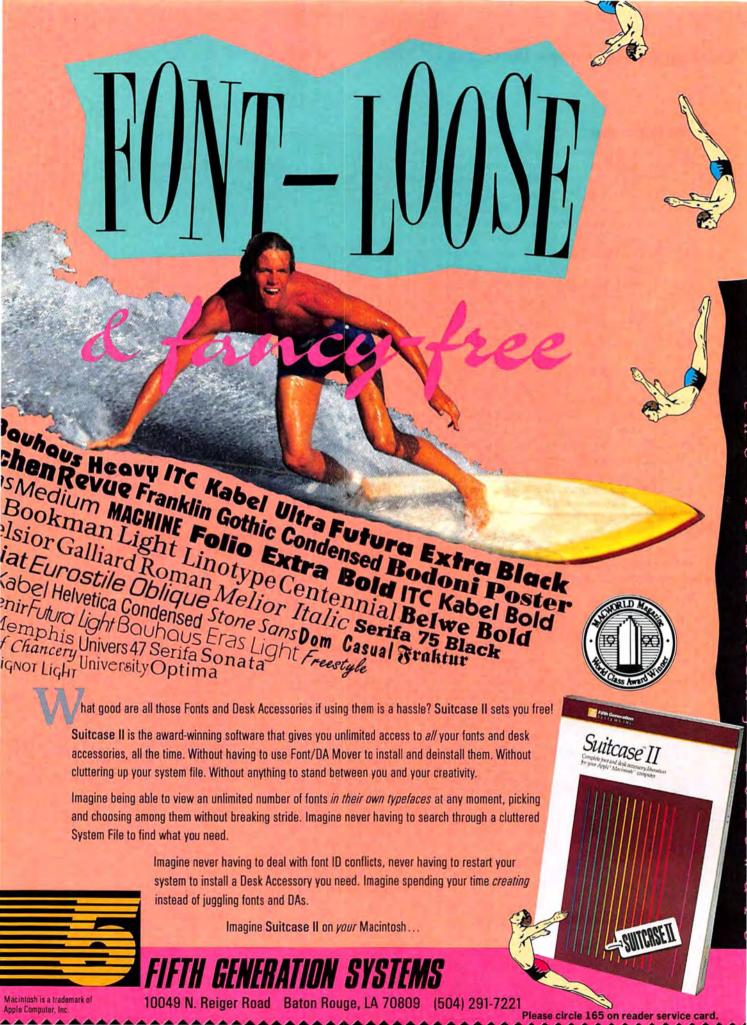
ON Technology
One Cambridge Center
Cambridge, MA 02142
(617) 225-2545
On Location, $129.95

Preferred Publishers
5100 Poplar Ave., Suite 617
Memphis, TN 38137
(800) 446-6393
DAtabase, $129.95

Prescience
814 Castro St.
San Francisco, CA 94114
(415) 282-5864
Expressionist, $129.95

Symantec
10201 Torre Ave.
Cupertino, CA 95014
(408) 253-9600
MORE 3.0, $395
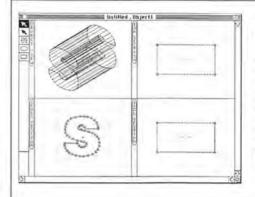
Creating a 3-D Logo

A step-by-step guide to creating a 3-D PostScript logo
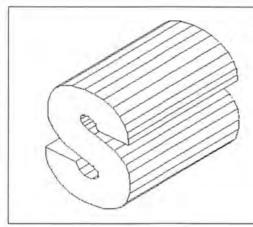
A space-science museum with a bold expansion plan wanted a logo that would convey a sense of evolution and growth. The proposed design used 3-D graphics to depict a living cell undergoing cell division. The designer chose a 3-D rendering program to quickly create several potential looks and to render complex intersecting figures that incorporated the letter S (for *space* and *science*) into the cell design. These images then served as templates for tracing the final logo into a PostScript illustration program. The completed graphic can be printed at any size without losing resolution.

Verbum: The Journal of Personal Computer Aesthetics can be reached at P.O. Box 15439, San Diego, CA 92115; (619) 233-9977.

Toolbox

Hardware: Mac IIci with 5 megabytes of RAM and an internal 200-megabyte hard-disk drive; SuperMac 24-bit graphics card and 19-inch color monitor; Tektronix Phaser CPS wax-thermal printer. Software: paint program, Swivel 3D Professional, FreeHand 2.0.

● **By the editors of** *Verbum* **magazine**

1. Making the 3-D Letter

To create a letterform that looks three-dimensional, you can use a paint program to create an uppercase S in Helvetica Black; copy it to the Clipboard; and then paste it into Swivel 3D Professional, where it serves as a template. You can plot the outline of the S with points and use it as a cross section for rendering an extruded shape. Extrusion causes each point to be extended backward by a specified length, creating a solid-looking shape constructed of long, thin facets. The extruded figure (upper left) is shown in wire-frame mode at a viewing angle of 45 degrees in the vertical and horizontal planes.

2. Rendering a Solid Image

So you can see what the solid 3-D image will look like, render the wire-frame S with its hidden surfaces removed.

3. Creating Intersecting Shapes

To create a group of three interlocking shapes, copy the first extruded S, rotate it 90 degrees horizontally, and position it to the right of the original. Rotate and position another copy to form the S at the top. The three Ss appear to interpenetrate; Swivel 3D shows this on-screen even as the copies are being rotated and positioned. The final image (depicted with flat shading) shows how the three shapes intersect; this effect would be difficult to calculate and render with conventional drafting methods. (Many of these techniques could also be achieved with StrataVision 3d or Super 3D.)

4. Shading the Image

Render the completed image with smooth (Phong) shading, which averages the differences in gray values between the facets. Define the light source as coming from slightly below and to the right of the figure; Swivel 3D calculates each surface's orientation to the light source to determine the appropriate shades of gray. Apply an anti-aliasing function to minimize the jagged edges that appear along diagonal lines in bit-mapped images. You can proof the artwork on a wax-thermal color printer and then use the artwork to produce the final logo in FreeHand.

7. The Finished Logo

The completed PostScript graphic is one of three 3-D images in the final logo. Because PostScript is used for the final rendering, each image can be blown up smoothly to any size for use on items ranging from letterheads to banners.

5. Converting the 3-D Image to PostScript

You can use the PICT image generated by Swivel 3D as a template in FreeHand. Using FreeHand's curve and corner tools, carefully trace the outline of each *S*; you can trace the shapes forming the side surfaces more loosely. The smoothly shaded version of the original 3-D file serves as a guide for filling in the *S* shapes with solid grays. The sides are given graduated fills that vary from light to dark gray along angles that follow the axes of the shapes.

6. Rendering the PostScript Image

The FreeHand rendering looks faceted on-screen, but the graduated fills blend smoothly when printed on a PostScript printer.

8. Animating the Image

The space-science center also wanted an animated version of the image for video presentations. In a future issue, we'll show how to animate the logo using Swivel 3D and MacroMind Director.

SPACE FOR
SCIENCE

In the 80's (the *1680's*), René Descartes, noted French philosopher, mathematician, and committed spreadsheet user, uttered the immortal words...
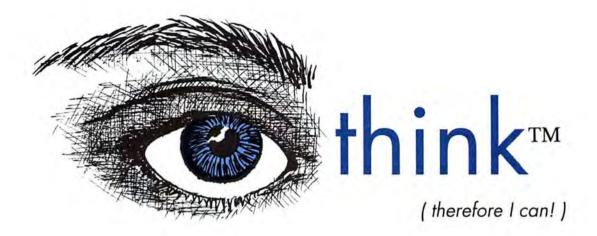
"Cogito ergo sum"

(I think, therefore I am.)

This approach worked just fine in the 80's.

But now it's the *90's*. And, in today's increasingly competitive business environment, it will take more than just a time-worn phrase and a spreadsheet to win.

INTRODUCING...

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(therefore I can!)

The **Visual Thinking Tool** for the 90's.

Spreadsheets put the numbers on top. The *relationships* are hidden underneath.

îthink™ turns the spreadsheet idea inside out.

The relationships go on top. You click them into place using building block icons. The numbers go inside the resulting diagram. Then you can animate the diagram to *see* the performance of the system.

Because in the 90's, the relationships are too important to hide!

Software from:

High Performance
S Y S T E M S inc.

45 Lyme Road
Hanover, NH 03755
1-800-332-1202
1-603-643-9502 (Fax)
Please circle 81 on reader service card.

Come see **îthink**™ for yourself. We'll be in **Booth 1600** at the Boston MacWorld Expo. Or call us for more information and a demo disk.

Focus: TypeStyler

TypeStyler is a font-manipulation program that lets you turn ordinary text into display type. It has numerous special effects for shaping and styling text automatically, enabling you to add pizzazz to logos, headlines, newsletters, and promotional materials. You can also export artwork in several graphics formats, including EPS, PICT, and editable Illustrator outlines. The following tips and techniques can help you transform your words into works of art.

Font Usage

TypeStyler works with any downloadable PostScript font, whether it's a Type 1 encrypted font from Adobe, a Type 1 or Type 3 font from another type vendor, or a font you've created with Fontographer. To use a font in TypeStyler, you must first convert it into TypeStyler's proprietary SmoothFonts format. The program's Font Converter creates a copy of the outline version of your font, which is then indexed for reference.

TypeStyler supports both Suitcase and MasterJuggler, and it can access any font that's open through either of these two programs. It can locate printer, or outline, fonts both in the System Folder and in font folders used with Suitcase or MasterJuggler. When launched, TypeStyler opens only those SmoothFonts for which there is a currently open screen, or bit-mapped, font. Thus, by opening and closing font suitcases, you can control the number of fonts you have available when running TypeStyler. (TypeStyler will open the SmoothFonts that come with the program even if you don't have the corresponding screen fonts installed, because the screen fonts are incorporated into the SmoothFont files.)

If you want to output your font artwork at a service bureau, the simplest route is to save it as an EPS file. Then all you have to carry to the service bureau is the image file itself. If this is impractical, or if you might need to adjust the artwork later, you'll have to print the image from inside TypeStyler. This makes

By Harry Wilker

Creating effective display type is easier than you think.

printing more cumbersome, since you'll also have to take along TypeStyler, the Smooth-Font files that contain the outline fonts, and a suitcase file containing the corresponding screen fonts.

Fitting Text to Panel Backgrounds

In addition to text, TypeStyler lets you manipulate geometric shapes, which can become styled backgrounds for your text. Figure 1 shows a panel acting as a backdrop to some text. Notice how precisely the text conforms to the background panel. Aligning the two objects by eye could be quite a chore, but TypeStyler's Copy/Paste Attributes commands make the process easy. The following instructions explain how.

Create the panel by selecting the panel tool and dragging out a rectangle. The Panel

Creating Text Backdrops

Figure 1: TypeStyler lets you manipulate geometric shapes, which can become text backdrops.
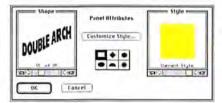
Figure 2: You can create panels with customized shapes, styles, and colors using the Panel Attributes dialog box.

Figure 3: This text can be aligned with the background panel simply by using the Copy/Paste Attributes commands.

Attributes dialog box appears (see Figure 2). Select the basic panel shape (rectangular, oval, or whatever), and then customize the shape and style to suit your needs. In the example, I chose the rectangular panel and the double-arch shape (Number 10) and modified the basic style (Number 1) by adding a fill color.

Next, create your text object by selecting the text tool and dragging out another rectangle. When the Text Attributes dialog box appears, select the font you want and enter your text. Then create or select the text style you want. Don't select a shape for the text yet. For the example (see Figure 3), I used the Hammond font and modified the style by adding color and a dual-blend fill (Number 19) and removing the background shadow.

To shape, size, and place the text directly on top of (and aligned with) the panel, select the panel and choose Copy Attributes from the Edit menu. Then select the text object and choose Paste Attributes. In the dialog box, check the boxes for Shape and Area and then click

Figure 4: Exporting Text Outlines

Figure 4: Text effects created in TypeStyler (a) can be exported as Illustrator 1.1 files. When you open the file in FreeHand or Illustrator, the characters have editable points and paths (b).

on Paste. TypeStyler places and shapes the text so that it lines up with the background panel, just as it does in Figure 1.
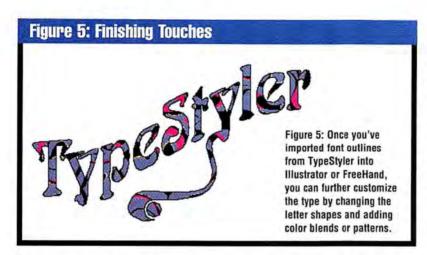
Exporting Images

TypeStyler is versatile, but there are still some things you can do better in Illustrator or FreeHand. Suppose you want to shape some text with TypeStyler and fill the text with a PostScript design created in Illustrator. Or perhaps you want to add a flourish to a particular character. Here's how to export images to PostScript drawing programs: First create the object, shaping and sizing it as needed (see Figure 4a). Choose Export

Introducing the Macintosh

Figure 5: Finishing Touches

Figure 5: Once you've imported font outlines from TypeStyler into Illustrator or FreeHand, you can further customize the type by changing the letter shapes and adding color blends or patterns.

from the File menu, select the button for Illustrator format, and export the file. Then open the file inside Illustrator. If you select the image, you'll see editable points and paths (see Figure 4b).

You can then use your shaped text as a clipping path, or mask, or you can ungroup the points and change the letter shapes. Doing both could give you an image like that in Figure 5 (the font is Adobe's Arnold Böcklin).

Images in a Word Processor

TypeStyler lets you create EPS files that you can import into applications such as PageMaker or QuarkXPress. But what if you want to use TypeStyler images in applications that don't support EPS files, such as Microsoft Word? Use the Option-Copy command. This simple keyboard shortcut lets you sneak EPS images into many "hostile" programs, and it works for all EPS images, not just those created in TypeStyler.

First, from inside TypeStyler, select the object you wish to paste. Then hold down the Option key while selecting Copy from the Edit menu (or use the keyboard shortcut Option-Command-C). As the object is pasted to the Clipboard, you will see the message "Embedding PostScript in PICT." Paste the object from the Clipboard into your Word document (or any other document). When you send the file to a PostScript printer, the PostScript commands embedded in the PICT image get downloaded, and a smooth PostScript image is created.

Harry Wilker is vice president for product development at Broderbund Software, the publisher of TypeStyler.

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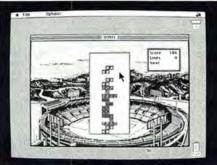
92 dpi for legal or A4 documents- just click.
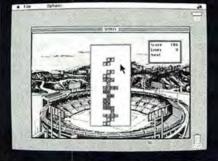
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A Prepress Primer

Preparing a print job for offset press was once an arcane art. The Mac has brought many of these preparation techniques to the desktop.

By Henry Bortman

What's all this prepress stuff everybody's talking about? And why should Mac users care? Just what is it that prepress people — they're called *color strippers*, by the way — do to a print job to prepare it for the printing press?

To print a job on an offset press, the printer uses a *plate*, which contains an image of the page to be printed. The plate is clamped to a cylinder, and when the press runs, the rotating plate receives ink from inking rollers. Ink sticks to the plate where the image is and washes away where it's not. The inked image then gets transferred from the plate to a rubber mat, called a *blanket*. Finally, the blanket transfers the ink to the paper as it feeds through the press. (For the techno-trivia-minded: This indirect-transfer process — plate to blanket and blanket to paper — is where *offset printing* gets its name.)

If the image is one color (usually black), your job needs only one plate. If it contains multiple colors, you need a separate plate for each color. If your print job has just one or two *spot colors*, the extra plates are no problem. However, full-color images such as photographs have so many colors that they must be printed using the *four-color process*. This special process uses cyan, magenta, yellow, and black (CMYK) inks to simulate the full color spectrum. A job that uses the four-color process requires four plates — one for each of the four ink colors.

Prepress means getting a print job ready to make the plates that go on the press. A plate contains an image of the printed page or of one color that appears on the page. How does that image get onto the plate? From a negative. To make a plate, strippers shine a light through a negative of the image onto a photosensitive plate. They then develop the plate, much as you would a photograph. Sometimes, if the image is complex enough, they must use several negatives, exposing the plate to each one separately. This tricky process is called *double-burning* a plate. Similarly, a single image element may have to be burned separately on different plates.

Strippers perform the tedious work of creating negatives for all the separate elements of a complex color print job, combining them into final negatives and burning the plates. It's a highly specialized craft. I sometimes take an ad in a magazine and ask a stripper friend what she would have to do to prepare it for the press. On a good day, I can almost follow her explanation of all the steps involved.
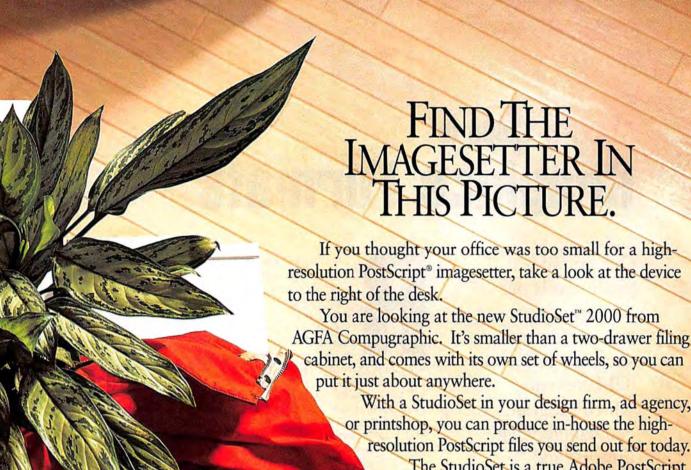
On the other hand, when I show her what I can do on the Mac, her jaw drops. Programs that do color retouching, drawing, page layout, and color separation let Mac users do much of the work of traditional stripping, eliminating many time-consuming steps. These programs also let you see the effects of changes almost immediately. You may think it takes a long time for Adobe Illustrator to preview a drawing, but traditional strippers can't see the result of their work until all the negatives are made and combined into a final set of films. Only then can they produce a color proof — an expensive process — and see whether their ideas worked or not. With the Mac, you don't create the film until you have adjusted your image to be the way you want it. Rough color proofing can be as simple as selecting Print from the File menu. (For more on color proofing, see "Proof Positive," July '90, page 183.)

The Mac still can't do everything traditional stripping methods can, however. Color calibration — getting the colors on-screen to look the same as the colors that appear on the printed page — is still a problem. Nor are today's color printers good enough to serve as final proofing devices. Furthermore, Mac-based applications still can't handle some of the specific techniques that strippers use to guarantee that different elements of an image will align properly, without leaving white gaps. For example, Mac tools currently can't correctly drop colored headline type out of a full-color photographic image.

Still, Mac prepress technology is growing by leaps and bounds, and costs are going down rapidly. Prepress is definitely destined for the desktop.

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Graphics Formats

Our graphics guide spells out the difference between formats such as PICT and TIFF, reveals which programs can handle what images, and shows you how to convert files from one format to another — all on a poster that you can hang on the wall for ready reference.

R emember the good old days of Mac graphics? Life was simple. There were two programs — one for painting (MacPaint) and one for drawing (MacDraw). Each was black-and-white only, and each had a single file format associated with it — MacPaint for you-know-what and PICT for MacDraw. Even when upstarts such as MacDraft and SuperPaint came along, the world of Mac graphics remained simple — limited, but simple.

And then all hell broke loose. Color came to the Mac, along with scanned images, 3-D artwork, animation, and, of course, PostScript. Each advance brought with it a new genre of applications, accompanied by the need for new file formats to store and transport the increasingly sophisticated images. Today, the world of Mac graphics is a digital Tower of Babel, with a multitude of languages that no two programs speak in quite the same way. To help you translate, we've prepared the definitive guide to Mac graphics — and put it all onto a poster for easy, hang-it-on-the-wall reference.

Graphics Glossary

The Mac's original graphics formats have been joined by a host of newcomers with catchy names such as TIFF, EPS, and PICS. Many of these formats have subdivisions of their own — there are three types of TIFF files (officially) and two forms of EPS. Plain old PICT now has a colorful sibling, PICT2, and the advent of 24-bit color has spawned still more subformats (24-bit PICT2 and binary EPS). As if that weren't enough, many programs also have proprietary formats, which are rarely recognized by other applications.

Figure 1: Errors of Import
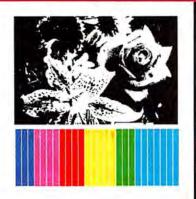
Figure 1: Just because a program can import an image doesn't mean it retains all the essential attributes. For example, when a 256-color image (left) is opened in MacDraw, it undergoes a drastic color change (right). MacDraw supports only eight colors, so the image's bit-mapped flowers lose all color, whereas the object-oriented color bars are converted to the closest match of MacDraw's basic colors.

By Salvatore Parascandolo and Aileen Abernathy

This alphabet soup of file formats is enough to confuse even the most hardened graphics guru. The MacUser Glossary of Graphics Formats, on side 1 of our pull-out poster, provides a comprehensive look at the various options for saving and editing graphics. The accompanying illustrations can help you understand the differences between the two major types of graphics — bit-mapped and object-oriented — along with their uses and limitations.

Program Compatibility

Once you understand graphics formats, you still have to figure out which programs can handle what formats. Each application has its own finicky rules about what file formats it accepts, and user manuals and simple import/export charts don't always prepare you for the subtlety and variety of results. Some programs can import a format, but they lose attributes — such as color or PostScript curves — along the way (see Figure 1). Once you've successfully imported an image, you may not be able to edit it. And then there's printing . . . .

On side 2 of our poster, you'll find the Program Compatibility chart, which reveals how well many popular programs import, edit, and print the various graphics formats. In addition, the chart reflects

Figure 2: Scaling Bit Maps
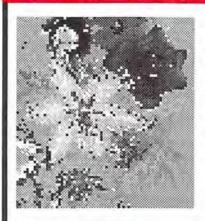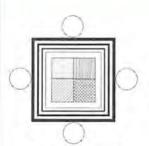
Figure 2: Using a painting program to reduce the size of a bit map can permanently destroy some details. This reduced-then-enlarged image lacks some of the original details that enlargement could not bring back. Tip: When you need to adjust the size of a bit-mapped graphic, import it into an object-oriented program, which retains complete pixel information regardless of scale.

information gathered from the developer of each listed application, supplemented with our own in-house tests. We prepared our test files by using FreeHand and Illustrator for object-oriented EPS graphics; Canvas for object-oriented PICT and PICT2 documents; Digital Darkroom for MacPaint, gray-scale PICT2, TIFF, and EPS bit maps; and Photoshop for color bit maps in 8- and 24-bit PICT2, color TIFF, and EPS (both binary and ASCII).
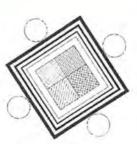
For each program, our first notation shows whether it can import (or display)

a particular format. There are several ways to import graphics into applications. FreeHand and Illustrator, for example, can either open or place a document. *Open* generally means you can access the file for full-scale editing (changing colors, patterns, shapes, and so forth). *Place* is a more limited form of importing commonly used by page-layout programs. It merely puts a copy of the graphic into your open document, and you can perform only large-scale changes such as resizing or shearing. Not
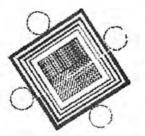
Figure 3: Image Rotation
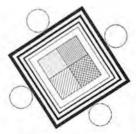
A. Original bit map **B. Rotated bit map** **C. Rotated object — screen** **D. Rotated object — printed**

Figure 3: Rotating a bit-mapped graphic in a painting program can be disastrous, as image B demonstrates. The individual pixels composing the image have been rearranged so the image merely *looks* rotated. Unless it's done in perfect 90-degree steps, rotation generally wreaks havoc on a bit-mapped image, producing unwanted side effects such as the shattered patterns and crumbly lines that you see here. However, an object-oriented program rotates a bit map as a whole chunk. When the same image is imported and rotated in FreeHand, it looks awful on-screen (C), but it prints unscathed (D).

all applications use the Place command to mean place — some use Get Picture or another simple phrase.

To receive a nod for editing ability, an application must be able to fully manipulate the format in question — that is, it must be capable of making changes to the smallest element of an image. For bit maps, editing means changing pixel colors, erasing image areas, brushing on new color, and painting new items. For object-oriented graphics, you should be able to ungroup elements; change the color or line widths of individual objects; and restack, resize, or reshape one or more items. A program did not receive an editing icon if it could perform only large-scale changes such as scaling, cropping, rotation, and gray-scale or color adjustment. These operations, called *transformations*, are not true editing functions.

To judge each program's printing capabilities, we output the test files to the appropriate printers: black-and-white and color, PostScript and QuickDraw. If the image printed with no surprises and matched its screen counterpart, the program passed with flying colors.

A printing tip: To get the most predictable results, especially from gray-scale and color PICT2 files, be sure to use version 6.0 or later of the LaserWriter driver. This upgrade properly converts true grays and colors to acceptable black-and-white halftones (dithered images resembling newspaper photographs) instead of printing high-contrast black-and-white disappointments.

Format Conversion

What do you do if you have a TIFF file on your hands but your application accepts only PICT format? Or say you have a perfect gray-scale EPS image, but it's useless to you unless it's a monochrome TIFF? Chances are, if you look around on your software shelf or hard disk, you can find an application that converts the graphic you have to the format you need. Our Format Conversion chart (side 2 of the poster) can help you locate the right tool for the job.

The chart presents a variety of options for converting one type of graphics file to another, using popular applications that you may already have on hand. Bear in mind that these are not the only possibilities. Countless other permutations could produce acceptable results. New programs are always in the wings, and many existing applications undergo periodic

upgrades that usually expand the types of files they can import, edit, and export.

Note that some applications may omit image attributes when they export files in PICT or another generic format. For example, programs that let you draw with smooth Bezier curves, such as Dreams and Canvas, convert them to unsmoothed QuickDraw polygons with countless vertices when they are saved in PICT format. Other generic modes of saving these files may preserve most or all of the original attributes.

The Format Conversion chart implies that you can convert objects to bit maps; this is true enough, but it always results in an inevitable loss of object-oriented editability and print quality. Even in light of these irreversible losses, you may find it necessary to convert objects to bit maps. If you do, be sure to keep a backup version of the original object-oriented file(s), because once the conversion has occurred, there's no going back. Note that there's no conversion of bit maps to true objects, although some applications can treat imported bit maps as free-floating restackable objects, which simplifies layout and what-if chores.

You also lose image quality if you convert from a format capable of storing lots of colors (such as 24-bit PICT2) to a format of less color capacity (8-bit PICT2 or monochrome TIFF). When downgrading the color content of a document, some applications do their best to dither (mix available colors in random patterns) to simulate more colors than can exist individually. Other applications simply use the closest available colors in their limited palette, which can produce incredibly poor results (see Figure 1).

When you convert a format that holds a few colors to one that can hold many colors, new colors don't magically appear in the image. Instead, you now have the capability to add new colors.

Depending on your application, the color mode of your monitor may restrict the number of colors you can use in an application or export to other applications. In some cases, the program maintains true colors in the stored document but displays dithered approximations. In other cases, the application limits your working colors to whatever the display system can handle. For example, you may not be able to work with a 24-bit document on an 8-bit display or with an 8-bit document on a black-and-white display.

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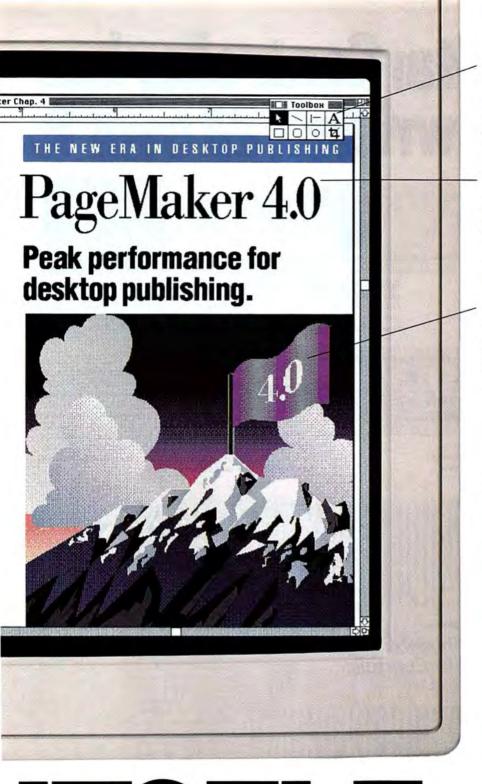
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The End of SneakerNet?
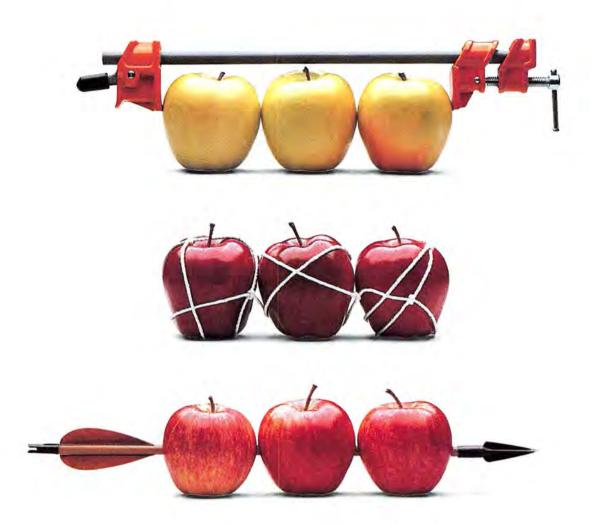
MacUser NetWorkShop looks at four ways to move files — quickly — from one Mac to another over AppleTalk networks.

By Stephan Somogyi and Henry Bortman

Psst. Want a cheap and easy time-tested network solution? It's called SneakerNet. SneakerNet has long been the most common method of file transfer between Macs. It works as follows: Copy file from hard disk #1 onto floppy disk; eject disk from Mac #1; place floppy in hand or shirt pocket; walk down hall; insert floppy in Mac #2; copy file from floppy disk to hard disk #2. SneakerNet has several advantages. It's free (if you have some spare floppies lying around). It rarely requires technical support. And if you're basically a couch potato, you can convince yourself you're getting aerobic exercise when you use it.

But SneakerNet is no panacea. As networks grow in physical size and files become too large to fit on floppies, SneakerNet loses its viability. If it's time for you to move up to a *real* file-transfer solution, there are lots of options to ponder. E-mail systems that allow file enclosures offer a solution for some users, but most E-mail setups require a dedicated server. TOPS has also been a mainstay for many small networks — and some large ones — providing point-to-point file-transfer capability based on a distributed-server model (see the "Server-Speak" sidebar for an explanation of file-transfer terms). But in its current incarnation, the $299-per-node TOPS Network Bundle, which includes print serving and E-mail as well as file-transfer

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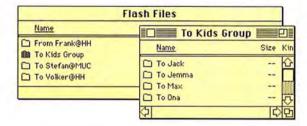
Figure 1: Flash uses Finder folders to send and receive files. When you place a file into another user's folder on your hard disk, Flash sends a copy of the file to that user.
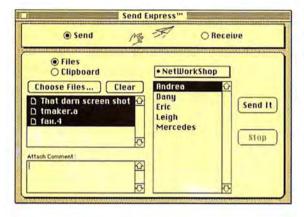
Figure 2: Send Express provides a DA in which you build a list of files to send to another user. To retrieve files sent to you, you must put Send Express into Receive mode (not shown) and "save" them.
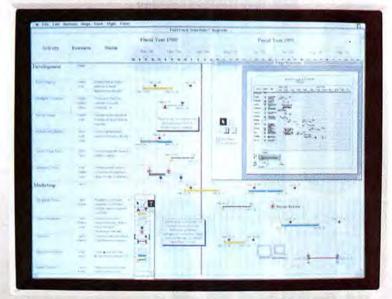
capability, is an expensive solution for those who just want to move files from one Mac to another.

Recently, several new serverless, or *peer-to-peer*, products have emerged as alternatives for moving files between Macs on an AppleTalk network. MacUser NetWorkShop put four of these programs — Flash, Send Express, LapLink Mac III Network Pac, and Oscar — through their paces to see whether the time had come for SneakerNet to retire. For comparison, we also measured the file-transfer performance of Timbuktu, Carbon Copy Mac, and TOPS.

The results were not entirely what we'd expected. We'd assumed, as you might, that the most important aspect of these programs would be the speed with which they move files across the network. But raw performance is not necessarily the ultimate measure of value. Two other factors that affect the user's experience of the programs mattered more.

The first of these is the user interface. If it takes you half a dozen steps to set up

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WHAT'S ONE WITHOUT THE OTHER? KODAK

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a file transfer each time you want to send or receive files, you've wasted more time than a speedier program will save you. The second factor is background operation. If a program doesn't operate in the background at all or if it degrades foreground mouse movements or typing, the annoyance factor will outweigh the joy of a fast file transfer. Ask yourself: Do you really care when your file gets to its destination? Or wouldn't you rather initiate the process quickly and easily and then have the software get out of your way while you get some other work done?

Flash

Flash is an INIT/DA combination from Beagle Bros. The INIT handles the background transmission and receipt of the files, and the DA lets you set Flash's many options — such as what sound it should make when an error occurs — and allows Flash users to chat amongst themselves over the network.

Flash, along with Oscar, has the simplest interface of the products we reviewed. Once you've installed the INIT by dragging it into the System Folder directly from the Finder, Flash automatically creates a folder called Flash Files (see Figure 1) in the root of the Startup Disk. Within this folder, you can make a To folder for each Flash user you want to send files to, or Flash can create To folders for other active Flash users automatically if you prefer. It also creates a From folder for each user from whom you receive a file.
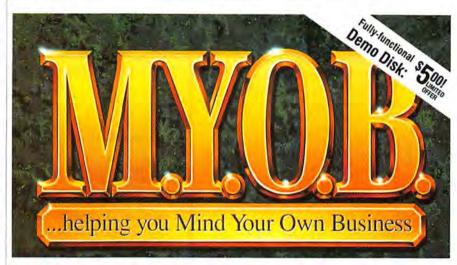
The moment you place a file in a person's To folder, Flash sends a copy. It then puts the original into its Sent Files folder. If you often send files to the same group of people, Flash has a feature you'll find valuable. It lets you create a group folder, with folders for several individuals within it. When you drag a file to the group folder, Flash sends a copy to everyone in the group. None of the other products offer this feature.

Flash operates in the background with or without MultiFinder. When sending or receiving a file, it makes the Mac a bit jerky, but it doesn't inhibit work too much. And although it's not the fastest program we tested (see the "File-Transfer Speeds" sidebar), at $199.95 per zone (a zone typically includes up to 40 users), Flash offers the best performance for the price. If you're looking for simple file-transfer software, consider Flash first.

Send Express

Send Express, like Flash, is a combination INIT and DA. However, unlike Flash, Send Express handles sending files to and receiving them from the DA. To send files, you build a list within the DA (see Figure 2) by selecting files from a standard File dialog box. Send Express doesn't let you add folders to the list. You then select a recipient from a second list (which Send Express builds automatically).

Send Express works in the background,

even without MultiFinder. Once it starts the transfer, you can close the DA and Send Express continues sending invisibly. Of all the software we tested, Send Express had the smoothest background operation; it was nearly imperceptible. Although Send Express' speed is not top of the line, its smooth background performance compensates for its slow transfer time. Send Express can also send the contents of the Clipboard.

The interface is cumbersome to use, however. When Send Express receives a file, it stores it in a special Receive Folder within the System Folder and notifies you to open its DA. From the DA, you must select Receive mode and "save" the file. You can't just copy a file from the Receive Folder to another folder on your hard disk by using the Finder; you have to use the Send Express DA. If you don't, the program gets seriously confused.

Send Express' smooth backgrounding makes it a good choice for slow CPUs. But the process of sending and receiving files could be streamlined. If you move lots of files, the several steps required can be a hindrance. Still, at $179 for five users, Send Express is a good value.

LapLink Mac III Network Pac
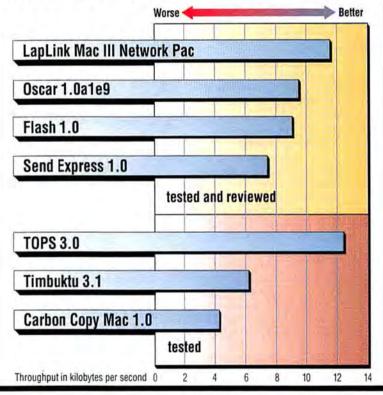
Traveling Software has taken the networking functionality of its Connectivity Pac (see "From Here to There and Back Again," August '90, page 219) and repackaged it as a stand-alone product called the Network Pac. The Network Pac is a specialized version of the LapLink application that lets you exchange files with other Macs that are also running LapLink file-transfer software. When the application launches, you first

File-Transfer Speeds

We tested the throughput of four programs designed to transfer files between Macs over LocalTalk without a server: Flash, LapLink Mac III Network Pac, Oscar, and Send Express. We used one SE and one SE/30 connected on a LocalTalk network. The sizes of our test files ranged from 20K to half a megabyte. The numbers shown reflect the average throughput for all the tests. LapLink, although the fastest of the four by a significant margin, is expensive and difficult to use. Send Express' performance is not as impressive as that of Oscar and Flash (which are virtually tied), but the smoothness of its background operation is exemplary.

We also compared TOPS, Timbuktu, and Carbon Copy Mac. TOPS, a distributed-server program, outran all four of the file-transfer programs, whereas the two screen-sharing programs, Timbuktu and Carbon Copy Mac, were slower.

Worse ←——————→ Better

LapLink Mac III Network Pac

Oscar 1.0a1e9

Flash 1.0

Send Express 1.0

tested and reviewed

TOPS 3.0

Timbuktu 3.1

Carbon Copy Mac 1.0

tested

Throughput in kilobytes per second 0 2 4 6 8 10 12 14

Table 1: Features of File-Transfer Software

	Flash 1.0	LapLink Mac III Network Pac	Oscar 1.0a1e9	Send Express 1.0
Mouse rating	★★★★½	★★★	★★★★	★★★★
List price	$199.95 per zone	$299.95 for 5 users	free	$179 for 5 users
Mode of operation	Finder	application	Finder	DA
Initiating node can operate in background	●	○	●	●
Allows sending to groups of users	●	○	○	○
Allows sending of entire folders	●	●	●	○
Retrieves files from remote disk	○	●	○	○
Manufacturer	Beagle Bros 6215 Ferris Square Suite 100 San Diego, CA 92121 (619) 452-5500	Traveling Software 18702 N. Creek Parkway Bothell, WA 98011 (800) 662-2652 (206) 483-8088	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	Gizmo Technologies P.O. Box 14177 Fremont, CA 94539 (415) 623-7899

● yes ○ no

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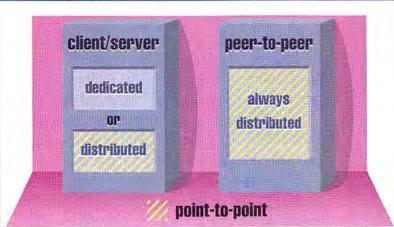
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select a remote Mac to connect to. Lap-Link then presents you with two lists of files: One list contains local files; the other has files from the remote Mac. You transfer files by selecting them from either of the two lists and clicking on the Transfer button. LapLink is the only

product of the four we reviewed that lets you retrieve files from a remote Mac as well as send files to it. LapLink supports folder transfers but not group sends.

Of the four packages we tested, Lap-Link performs the fastest but is by no means the fastest to use. Because it's an

application, it's not as convenient to use as a DA is — unless you have Multi-Finder and can commit 300K of RAM to keeping it permanently loaded. LapLink does come with an INIT that lets it run in the background on the remote machine, but the Mac that initiates the file transfer

ServerSpeak

Macs exchanging data on an AppleTalk network can do so following one of two models: client/server or peer-to-peer. In a *client/server* model, the two computers have different roles. Shared data resides on the *server*, which controls access to that data. The *client* logs onto the server and either accesses the data stored there or stores additional data there. A key feature of the client/server approach is that when a client logs on to the server, the server volume appears on the client's desktop as if it were a hard-disk or floppy-disk volume. Files on the server can be accessed from

within any application as if they were on a local disk. And if the application supports multiuser capability, as some database managers and other programs do, a client/server system allows more than one user to access the same file at the same time.
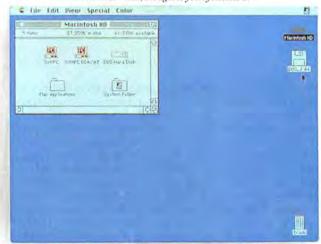
In a client/server model, servers can be either dedicated or distributed. A *dedicated server*, as its name implies, is a computer with the sole function of storing and controlling access to shared data. In other words, a dedicated server cannot double as a workstation. Apple's AppleShare is an example of a system that uses a dedicated file server. With

a *distributed-server* system, any computer can be both a server (granting other computers shared access to its data) and a client (accessing the shared data of other computers). TOPS is an example of a distributed-server system.

In a typical *peer-to-peer* system, as with a distributed-server system, any user can access shared data on other participating users' disk volumes. However — and this is the key factor that distinguishes peer-to-peer from client/server — the file-transfer capability is not integrated into the Mac's file system. Even though accessing another user's Mac may seem similar (some peer-to-peer programs, such as Oscar and Flash, even use the Finder as the interface for initiating their file transfers), in a peer-to-peer system, remote volumes do not appear on your desktop.

If this isn't confusing enough, here's one more term: *point-to-point*. This refers to file transfers or messages that go directly from one user's machine to another's. Distributed-server systems (such as TOPS) and peer-to-peer systems (such as Oscar) both utilize point-to-point transfers. By contrast, in a dedicated-server system, such as AppleShare, if Sue wants to send a file to Mary, she must actually send it to a server to which they both have access. Mary can then retrieve it from the server. Point-to-point transfers have the advantage of being single-step processes.

Table 1: Features of File-Transfer Software, continued

	Carbon Copy Mac 1.0.4	Timbuktu 3.1	TOPS 3.0
Mouse rating	NA	NA	NA
List price	$199 per user	$149 per user	$299 per user
Mode of operation	DA	DA	Finder or DA
Initiating node can operate in background	○	○	○
Allows sending to groups of users	NA	NA	NA
Allows sending of entire folders	●	●	●
Retrieves files from remote disk	●	●	●
Manufacturer	Microcom Software Division 500 River Ridge Drive Norwood, MA 02062 (617) 551-1999	Farallon Computing 2000 Powell St. Suite 600 Emeryville, CA 94608 (415) 596-9100	TOPS Corp. 950 Marina Village Parkway Alameda, CA 94501 (800) 445-8677 (415) 769-9669

● yes   ○ no

must use the application, which does not run in the background. So the Mac that initiates a file transfer is tied up until the transfer is complete. LapLink is also slow to launch, and once it's launched, you must go through several steps to connect with the remote machine and actually transfer files. If you plan to use the software often, this is a stumbling block.

LapLink has some unique features, however. It allows you to designate specific folders as read-only or drop (write-only) folders. You can also apply restrictions when transferring files — for example, you can tell it to transfer only those files that are newer than already existing files in the target directory.

Although LapLink Mac III Network Pac is the fastest of the four products we evaluated, it is one of the most difficult to use, and it can't run in the background on the Mac that initiates the transfer. And at $299.95 for five users, it is far more expensive than the competition. Its companion product, the Connectivity Pac, is an excellent buy, but we don't recommend the Network Pac for simple point-to-point file transfers.

Oscar

We originally covered Oscar in our March '90 issue (page 241). It's an application written by Pete Helme of Apple's Macintosh Developer Technical Support group and is designed to run in the background under MultiFinder. It gobbles up around 225K — not great for people who don't have enough RAM to run Multi-Finder. Oscar works much like Flash does. It creates In Box and Out Box folders, which contain subfolders, each of which represents one other Oscar user. To send someone a file, you copy it into the appropriate Out Box folder. Once Oscar has sent the file, it deletes it, so you have to be very careful only to copy — not move — files to Out Box folders.

Oscar supports sending entire folders but doesn't support groups, so if you want to send a file to lots of people, you have to put a separate copy of the file in each person's Out Box folder.

Oscar's big advantage is that it's free. It's available on Phil and Dave's Excellent CD and A Disk Called Wanda, both of which are CD-ROM discs sent to Apple developers. You can also get Oscar on AppleLink and from Apple's FTP site (IP 130.43.2.2); it's available through user groups as well.

However, because Oscar isn't a commercial product, it isn't supported. And it has been known to crash — especially if you run many other applications under MultiFinder simultaneously. Oscar also requires that you have Apple's Desktop Manager INIT in your System Folder (see "Net Prophet," April '90, page 275) — and Apple hasn't yet released this INIT for general distribution. Currently, the only way to get it is if you own Apple-Share File Server software, although Apple is working on distributing it more broadly.

If none of this fazes you, Oscar's a great solution. The brave-hearted among us at *MacUser* use it regularly.

Other Options

For comparison, we looked at three programs that provide point-to-point file transfer but have significant other functionality — and a higher price tag — as well. Two of these, Farallon's Timbuktu and Microcom's Carbon Copy Mac, are primarily screen-sharing software. They allow one or more Mac users to see and control the screen of another Mac user, plus they provide file-transfer capability. Both allow users either to send a file or a folder to a remote machine or to retrieve one from it, and neither works in the background on the machine that initiates the transfer. Timbuktu has more

---

The Bottom Line

Flash is definitely the winner in this contest. Although not the fastest, its price of $199.95 per zone — even if you have 30 or 40 users in a zone — makes it the most cost-effective solution. **Send Express** has the smoothest background operation, which makes it a good choice for Plus and SE owners, but its interface is too complex for users who need to transfer files frequently. The adventurous and budget-minded could try **Oscar**. It's free, but it is also unsupported.

TOPS, Timbuktu, and Carbon Copy Mac can also serve your file-transfer needs, but they are very expensive solutions if all you want to do is move files between Macs. Consider TOPS if you need a distributed server; check out Timbuktu and Carbon Copy Mac if you're in the market for screen-sharing software.

BRIDGES

flexibility for restricting access to specific folders. Both transfer files more slowly than any of the other products we looked at — Timbuktu did a little better than Carbon Copy Mac. Both require several steps to initiate a file transfer. And both are too expensive ($149 or $199 *per user*) to be a good choice if you are looking only for file-transfer capability. However, if you're in the market for a product that performs these programs' main function — sharing Mac screens across a network — you may find their file-transfer capability adequate; it's unlikely that you would need to buy one of the other four programs as well.

TOPS, as we mentioned earlier, has been the main product used for moving files from Mac to Mac. For a long time, it was the only product that could do the job. TOPS is actually a distributed-server application. As with AppleShare, you as a TOPS client mount a volume from a remote machine that is acting as a TOPS server. It appears on your desktop as if it were a local hard disk. However, with TOPS (unlike with AppleShare) any machine can be both server and client. TOPS now comes bundled with print-spooler and E-mail software in a Network Bundle package. It is significantly faster than the peer-to-peer products reviewed earlier, but it is also more expensive ($299 per user). If TOPS' client/server architecture and other features are important to you, it is worth serious consideration, but for simple node-to-node transfer, it is no longer the reigning monarch. 🔲

Stephan Somogyi is MacUser NetWorkShop's manager and is investigating alternative methods of transferring himself to faraway places such as Europe, preferably over dial-up lines. Henry Bortman is MacUser NetWorkShop's director and thinks dial-up lines are too messy; he prefers direct matter transfer.

Report Cards

Flash ♠♠♠♠½

DA/INIT combination that transfers files in the background, with or without MultiFinder.
Pros: Uses Finder folders to send and receive files. Good price/performance. Group send. Chat capability.
Con: Setting the many options is unnecessarily complex.
Published by: Beagle Bros, 6215 Ferris Square, Suite 100, San Diego, CA 92121; (619) 452-5500.
Version: 1.0.
List Price: $199.95 per zone.

LapLink Mac III Network Pac ♠♠♠

Network-only version of LapLink's file-transfer application.
Pro: Fastest file-transfer speed.
Cons: Need to run the application to transfer files. Doesn't work in the background for node that initiates transfer. User interface too complex for frequent use. Relatively expensive.
Published by: Traveling Software, 18702 North Creek Parkway, Bothell, WA 98011; (800) 662-2652 or (206) 483-8088.
Version: 3.0.
List Price: $299.95 for five users.

Oscar ♠♠♠♠

Application that runs in the background under MultiFinder and uses the Finder as its primary user interface.
Pros: Free, fast, and easy to use.
Cons: Must run under MultiFinder to be active all the time. No group sends. No technical support.
Published by: Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.
Version: 1.0a1e9.
List Price: Free.

Send Express ♠♠♠♠

DA/INIT combination that sends files or Clipboard contents in the background, with or without MultiFinder.
Pros: Extremely smooth background operation that compensates for its sluggish performance. Reasonable price.
Cons: User interface too complex. Slowest of the four.
Published by: Gizmo Technologies, P.O. Box 14177, Fremont, CA 94539; (415) 623-7899.
Version: 1.0.
List Price: $179 for five users.
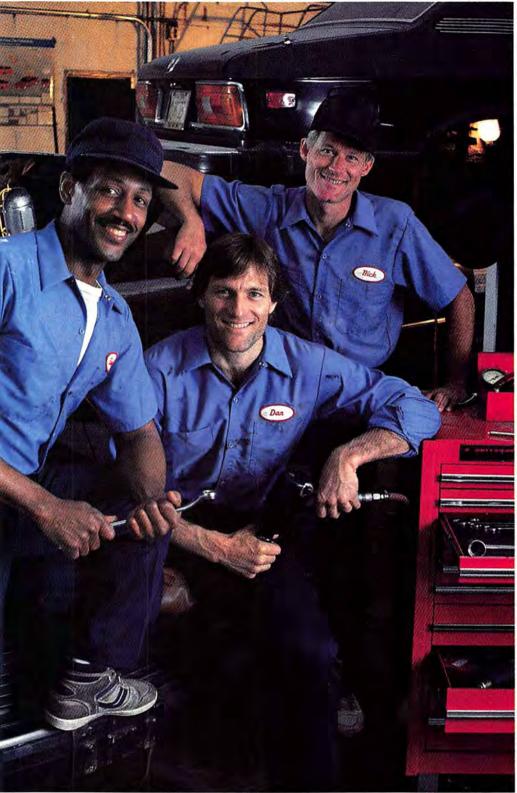
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Communications Toolbox

Apple's new Communications Toolbox
makes it easier for Mac applications to talk
to the rest of the world — and you don't
have to wait for System 7.

t's not one of the flashier parts of
System 7. Demonstrations of it
don't usually draw the oohs and
aahs that something such as IAC
(interapplication communication)
does. But although users will have
to wait several months for the other
aspects of 7, the Communications
Toolbox is here now.

The Communications Toolbox is de-
signed to make developers' and users'
lives easier by providing Mac applica-
tions with a standard interface for ac-
cessing communications services. Cur-
rently, every application that contains
communications capabilities (such as
MicroPhone II and VersaTerm Pro) has
its own custom code for implementing
each connection type, terminal emula-
tion, and file-transfer protocol. The
Communications Toolbox eliminates the
need for this program-specific code,
instead providing a standard set of com-
munications tools that work with all
applications; this frees developers to con-
centrate on the special features of their
programs.

Once developers have adapted their
programs to support the Communica-
tions Toolbox, they can easily add plug-
and-play solutions for scores of connec-
tivity problems without revising their
programs. Users can reconfigure their
communications software, whether
they're adding new terminal-emulation
capabilities or file transfer over DECnet,
simply by moving files into and out of a
folder. In addition, dialog boxes in com-
munications applications will have a set

By John Rizzo

Figure 1
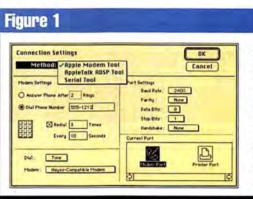
Figure 1: In applications that
use the Communications
Toolbox, the Configuration
dialog box will look
something like this. The
Method pop-up menu lists
the connection tools present
in the Communications
Folder, providing users with
a simple means of selecting
a connection method.

Figure 2
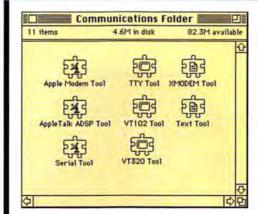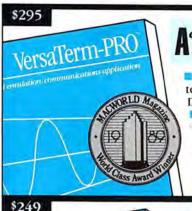
Figure 2: Hidden from view,
the Communications
Toolbox works through the
Communications Folder,
which lives inside the
System Folder. This new
folder contains tools for
(from left) connection,
terminal emulation, and
file transfer.

of common elements that will make
learning a new communications program
easier (see Figure 1).

Users won't see the Communications
Toolbox itself. What they will see is a
new Communications Folder, in the Sys-
tem Folder. This folder contains three

types of connectivity tools: connection
tools, terminal-emulation tools, and file-
transfer tools (see Figure 2). The con-
nection tools define different kinds of
physical and electrical connections, such
as serial, modem, and ISDN (integrated-
services digital network) connections,

between Macs and other computers. Terminal-emulation tools allow a Mac to emulate various types of terminals during communications sessions with a host, such as an IBM mainframe, a VAX minicomputer, or a UNIX workstation. File-transfer tools implement the protocols for transferring files between the Mac and other computers on different types of networks.

An ISDN connection tool for the Communications Toolbox is in the works.

Apple's basic connectivity tool kit includes connection tools for serial, modem, ADSP (AppleTalk Data Stream Protocol), and LAT (Local Area Transport) connections. ADSP is a protocol that provides error-free, full-duplex communication between nodes on an AppleTalk network; LAT is a DEC protocol for controlling VAX terminal traffic over Ethernet networks. These tools will be part of the initial release of System 7. Connection tools planned for future release will support IBM 3270, X.25, TCP/IP, and ISDN. Terminal-emulation tools in the basic set include TTY (Teletype) and VT102 and VT320 (two common VAX terminal types). The basic file-transfer tools include those for ASCII text and Xmodem file transfers.

Developers don't need to know the specifics of how these protocols work. The Communications Toolbox provides programmers with a simple, consistent set of program calls. For example, all a programmer must do to set up a connection with another computer is to call the routine to open a connection and then tell it which connection tool to use and the other computer's network address or phone number. The Communications Toolbox, which is part of the operating system, does all the dirty work.

This is how the Macintosh Toolbox works in general and is the main reason why all Mac programs are so similar. So if a majority of programs make use of the Communications Toolbox (which is likely), users will have to learn to use only one communications program. The interfaces of all programs that use the

Communications Toolbox will be similar, regardless of whether they are telecommunications programs or network file-transfer products.

The Communications Toolbox consists of three managers — the Connection Manager, the Terminal Manager, and the File Transfer Manager — one for each of the three types of tools. Developers of communications boards use a fourth manager — the Communications Resource Manager — to enable various Mac applications to access their boards. All this behind-the-scenes software machination may seem like mumbo jumbo, but it does result in some tangible benefits. For instance, the Communications Manager can handle multiple communications sessions regardless of the protocol type. This means that a single application can run a VAX session in one window, an IBM 3270 session in another, and an AppleTalk session in a third.
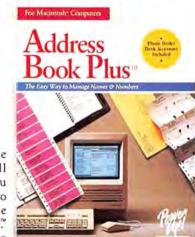
Getting Real

Several companies have already taken advantage of the Communications Toolbox. The VersaTerm family of terminal emulators, distributed by Synergy Software, makes use of the Connection and File Transfer Managers. As a result, VersaTerm can be used with TCP/IP, DECnet, LAT, and X.25 as easily as it can with AppleTalk. White Pine, a major producer of DEC terminal-emulation products for the Mac, has also jumped on the bandwagon. Version 3.1 of its VT-emulation products (Mac220, Mac240, and Mac241) are Communications Toolbox-compliant.

In the works is an ISDN tool for the Communications Toolbox. ISDN allows voice and data to be transmitted simultaneously over telephone lines without the use of a modem and at high speeds. One company already committed to the new tool is Farallon, which demonstrated an ISDN version of Timbuktu/Remote along with Apple's prototype ISDN NuBus board at this year's Apple Developers Conference.

Because the Communications Toolbox makes it easy for developers to add network functions to applications, we are likely to see more applications taking advantage of it. And there is no reason for Communications Toolbox-compliant applications to be limited to traditional communications software either. Does that mean we can expect a word processor with X.25 connections? Stay tuned. ▨

The Limits of LocalTalk

Just how many Macs *can* you connect to a LocalTalk network? The official answer is 32, but the real number depends on how hard you make your network work.

How many devices can be connected to a LocalTalk network before it gets intolerably slow? Too bad there isn't an easy answer. But there are some guidelines you can follow.

The number 32 is often thrown about as an absolute limit. Less than 32, they say, and life on LocalTalk is a breeze; cross the line, and your network grinds to a halt. What most people don't realize, though, is that this limit has nothing to do with the bandwidth (data-carrying capacity) of LocalTalk. Rather, it is based on the electrical characteristics of the connectors you use when you daisy-chain your Macs and LaserWriters. As the network signal travels through each connector, the connector introduces a small reflection (distortion) into the signal. When enough of these distortions are added on top of each other, the signal becomes unintelligible. So Apple, when it initially shipped LocalTalk, said, "Thou shalt not connect more than 32 devices to the net."

This electrical limit still holds today. If you are using a LocalTalk daisy chain, regardless of whose connectors you use, odds are you will have problems if you connect more than 32 devices. If your network is configured in a star topology, using a concentrator such as Nuvotech's TurboStar or Farallon's StarController, you can, electrically speaking, breach the

Figure 1: Kurt's Rule of Thumb

How Many Workstations Can You Put on a LocalTalk Network?

1 Total possible number of Macs

2 If your network uses

3 Subtract this number from your total

4 Enter number here

40

file transfer (server or point-to-point)		8
E-mail		8
multiuser database		8
screen-sharing software		3
network print spooler		3
terminal emulation over the network		2
shared 9,600-bps modem		2
two shared 2,400-bps modems		1
		TOTAL

Add the numbers in column **4**. Then subtract that total from 40. The difference is the number of Macs your LocalTalk network can comfortably support.

Figure 1: It's difficult to determine the maximum number of devices you can attach to a LocalTalk network. As a rule of thumb, start with 40 for a Mac network that uses the network only for moderate LaserWriter printing. For each additional service you have on your network, subtract the corresponding number of workstations to arrive at a new device limit that still yields reasonable network performance.

By Kurt VanderSluis

Manage and support all these Macs.

All without leaving here.

Train a user here

Collaborate with someone here

and solve a problem here

Access a file server here

Introducing Carbon Copy Mac™, a new networking and communications software tool that lets you visit hundreds of other Macs without leaving your office or your home.

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32-device limit without incident. But in practice, the data you send over your network can often bog the network down with far fewer than 32 devices connected.

When deciding how many devices to connect to your network, you need to think about how you and your coworkers use it. How many nodes you can get away with on LocalTalk depends mainly on four factors:

1. *What kind* of services you have available on your network. These include file servers, multiuser databases, mail servers, shared modems, and so on. Different services generate different amounts of traffic.

2. *How many* of each type of network service you have. If you have four printers, odds are you will have more traffic than if you have only one.

3. *How often* people use these services in their daily business activities. Devices don't generate much traffic just sitting there. You have to use them. The more you use them, the more bandwidth they will take up.

4. *How fast* the devices on your network transmit data. This is not primarily a CPU issue — a IIfx versus a Plus — although the model can make a difference. Rather, it has to do with how much bandwidth different types of network transmissions utilize. For example, when you use a 2,400-bps Shiva NetModem, it takes up only around 1 percent of LocalTalk's information-carrying capacity. When you copy a large file to or from a server, however, you use up 80 to 90 percent of the network's bandwidth. Printing to a LaserWriter consumes far less, because the LaserWriter cannot print information as fast as the network can deliver information to it.

A Rule of Thumb

Although there are commercial applications that can help you monitor how busy your network is (see "How to Set Up the Perfect Network," June '90, Buyer's Guide, page 4), they don't give you much help in figuring out how many devices to connect to it. Figure 1 shows a useful rule of thumb for the maximum number of devices on LocalTalk networks that support various types of network services. The numbers shown are for *workstations* only. They don't include servers and printers, since it is generally only workstations that initiate traffic.

An important note: I'm talking about a single network here, not an internet. If you have an internet with one or more routers, the Rule of Thumb applies to each component network separately.

In using Kurt's Rule of Thumb to calculate a workstation limit for your network, start with 40 workstations. (This is valid only for a star configuration; if you are daisy-chaining, 32 will be your maximum.) Then subtract the number shown in Figure 1 for each service available on your network. For example, if you are running TOPS (file transfer: subtract 8), QuickMail (electronic mail: subtract 8), Double Helix (multiuser database: subtract 8), and a Shiva V.32 NetModem (a shared 9,600-bps modem: subtract 2), then the Rule of Thumb says that you may have 14 workstations on your network.

Exceptions to the Rule

Although the Rule of Thumb is a useful starting point for your network, it's not very sophisticated. You may need to adjust these numbers, depending on your local needs. For example, although 8 is listed as the number to subtract for file transfer, if you frequently transfer large files (greater than 500K), your network will bog down much more quickly. Similarly, although moderate printer use is assumed in establishing the base number of 40, if you have several printers on your network and they are used heavily, you will have to include a subtraction factor for printing — four or five printers in constant use can swamp LocalTalk. On the other hand, if hardly anyone ever uses your E-mail system, you can get away with adding more workstations to your network than the E-mail penalty suggested would indicate.

If budget constraints are an issue, you can add more devices to the network than these numbers indicate, but the performance of your network will suffer. Adding more devices than the Rule of Thumb indicates won't introduce transmission errors; it will introduce only sluggishness. If you're willing to wait a little (or a lot) longer for your file to print or your mail message to be sent, go ahead and grow your network accordingly.

If your network has all the services mentioned, you're going to end up with a very small number of workstations — fewer than ten — as a limit. In this case, you might want to consider a higher-speed Ethernet (see "Are You Ready for Ethernet?" June '90, Buyer's Guide, page 20) or a token-ring network as an alternative to LocalTalk.

POWER TOOLS

EDITED
BY
JAMES BRADBURY

19 Ways to Customize Word

Microsoft Word becomes easier to use and more powerful at the same time when you take advantage of its tremendously flexible Commands feature.

One of the great things about the Mac is that each of us can customize our system to suit our personality and work habits. Novice Mac users can customize by choosing fonts, DAs, a desktop pattern, and a standard beep sound. More-experienced users can add custom startup screens, icons, and sampled sounds. And true Mac power users can take ResEdit and a disk or two full of INITs and create a Mac unlike any other.

But when it's time to get some work done, most Mac users launch Microsoft Word and see their individuality vanish. Everyone's copy of Word is the same, right?

Wrong. Word 4.0 includes a powerful customization ability that not only lets your personality shine but that also lets you access previously unavailable features and customize keyboard command equivalents.

You control Word's customization with the Commands command, which is at the bottom of the Edit menu. (If you're using Short Menus, choose the Full Menus command to make the Commands command appear.) The "Taking Command" sidebar explains how Commands works.

Commands allows you to customize Word by letting you choose the commands you want to appear on your menus from a list of more than 250. I have found the following 19 items very useful — maybe they'll give you some ideas for designing your own unique version of Word.

By Craig Danuloff

File

New	⌘N
Open...	⌘O
Close	⌘W
Save	⌘S
Save As...	⇧F7
Print Preview...	⌘I
Page Setup...	⇧F8
Print...	⌘P
✓Fast Save Enabled	⌘⌥F
✓Make Backup Files	⌘⌥B
Quit	⌘Q

● **Add the Fast Save Enabled command to the File menu.**

This command increases the speed of the Save command, thereby making it less painful to save your files frequently. When you use the Fast Save Enabled command, Word saves files in a special file format that's fine for saving work in progress. Fast Save isn't suitable for final versions, though. If files saved in this format are damaged, it's much harder, if not impossible, to recover them. Also, PageMaker has an easier time placing files saved in Word's Normal format. Placing Fast Save Enabled on the File menu makes it easy for you to select or deselect the command before you save. Word's default option is to add this command to the Edit menu, but it makes more sense to add it here.

● **Add the Make Backup Files command to the File menu.**

Normally, each time you save your work, the new version of your file overwrites the previous version. When you select the Make Backup Files command, however, Word makes a copy of the previous version of your file and names it Backup of Filename before executing the save. As a result, you always have the last two saved versions of your file on-disk. This means that you can go back to the previous version of your file, and you also have a backup in case something happens to the current version of your file.

Utilities

Find...	⌘F
Find Again	⌘⌥A
Change...	⌘H
Go To...	⌘G
Go Back	⌘⌥Z
Spelling...	⌘L
Hyphenate...	⇧F15
Word Count...	⌥F15
Sort	⌘⌥↑
Sort Descending	⌘⌥↓
Load Program into Memory	⌘⇧F9
Load File into Memory	⌘⇧F10

● **Add the Load File into Memory command to the Utilities menu.**

This command, which is normally in the Preferences dialog box, causes Word to keep the current document in RAM rather than keep only the currently displayed portion of the file in RAM and read the rest from disk as you scroll the file. If you're going to be scrolling up and down within your file frequently or executing commands that require Word to access the whole document (such as Spelling, Hyphenate, Repaginate Now, or Print), keeping the file in RAM can speed up Word's performance.

If you *always* work on files for long periods, you may be better off checking the Always Load File into Memory option in the Preferences dialog box rather than adding this command to your menu. However, if you sometimes open and close files without performing extensive editing, using this option as a command is more efficient.

● **Add the Load Program into Memory command to the Utilities menu.**

Like the Load File into Memory command, this command can also be set in the Preferences dialog box, but executing it as a preference means you have to wait for Word to be read into memory each time you launch it. If you ever use Word only to browse through a file or two, or to perform minor editing, the time needed to load it into memory doesn't justify the speed increase, so you wouldn't want this as a default preference. Keeping the command in the Utilities menu, though, lets you load Word into memory only when it pays off in performance. A good rule of thumb is to load Word into memory if you intend to use it for more than 15 minutes.

Utilities

Move to Start of Document	⌘⊞9
Move to End of Document	⌘⊞3
Move to Previous Character	←
Move to Next Character	→
Move to Previous Word	⌘←
Move to Next Word	⌘→
Move to Previous Sentence	⌘⊞7
Move to Next Sentence	⌘⊞1
Move to Previous Paragraph	⌘↑
Move to Next Paragraph	⌘↓
Move to Previous Line	↑
Move to Next Line	↓
Move to Start of Line	⊞7
Move to End of Line	⊞1
Move to Top of Window	⌘⊞5
Move to Bottom of Window	
Move to Previous Page	⌘page up
Move to Next Page	⌘page down

● **Add the Move to commands to the Utilities menu.**

Word provides an exhaustive array of cursor-movement commands that most users never discover. If you use the arrow keys to scroll across your files, learning to use these commands can give you a whole new perspective on word processing. Once you are familiar with the commands, learn the keyboard command equivalents for real efficiency. You can also use

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POWER TOOLS

Word provides an exhaustive array of cursor-movement commands.

these commands to select text; just add the Shift key to any of the keyboard command equivalents, and text is selected as you move the cursor.

Utilities

Find...	⌘F
Find Again	⌘~H
Change...	⌘H
Go To...	⌘G
Go Back	⌘~Z
Spelling...	⌘L
Hyphenate...	⇧F15
Word Count...	F15
Sort	⌘~↑
Sort Descending	⌘~↓
✓"Smart" Quotes	⌘'
Load Program into Memory	⌘⇧F9
Load File into Memory	⌘⇧F10

● **Add the "Smart" Quotes command to the Utilities menu.**

The "Smart" Quotes command tells Word to automatically replace the standard quote marks (" ") with the professional open and close quotes (" "). This is another feature that's buried in Word's Preferences dialog box, but if you choose to enable it that way, it's hard to turn off. By adding the "Smart" Quotes command to the Utilities menu, you can assign one keystroke (such as Command-") to toggle the feature on and off, and you can forget about the four arcane key combinations that Apple assigns to smart quotes: Option-[, Shift-Option-[, Option-], and Shift-Option-].

● **Add the Screen Test command to the Utilities menu.**

Did you know that Word had a built-in screen saver? Screen Test is a fancy full-color screen saver that offers nine choices of moving shapes.

Format

Hide Ruler	⌘R
✓Open Documents With Ruler	
Character...	⌘D
Paragraph...	⌘M
Section...	⌥F14
Document...	⌘F14
Styles...	
Define Styles...	⌘T
✓Plain For Style	⌘⇧_
Redefine Style From Selection	
✓Plain Text	⌘⇧Z
Bold	F10
Italic	F11
Underline	F12
Small Caps	⌘⇧H
All Caps	⌘⇧K
Page Break Before	
First Line Indent	⌘⇧F
Hanging Indent	⌘⇧T
Nest Paragraph	⌘⇧N
Unnest Paragraph	⌘⇧M

● **Add the Open Documents with Ruler command to the Format menu.**

If you like displaying the ruler when you work in Word, this command saves you the trouble of choosing the Show Ruler command every time you open a new file. Of course, you can still hide the ruler if you like simply by choosing the Hide Ruler command, or Command-R.

● **Add the First Line Indent, Hanging Indent, Nest Paragraph, and Unnest Paragraph commands to the Format menu.**

These four commands make it easy to get unformatted paragraphs into shape before you customize their indents. Without them, you are forced to bring up the ruler and drag indent markers or access the Paragraphs dialog box in order to shape your paragraphs.

● **Add the Redefine Style From Selection command to the Format menu.**

When you use style sheets, the standard way to redefine a style is to use the Define Styles command. It is far easier, however, to reformat a paragraph by using menu commands and

Taking Command

You control customization of Word through the Commands dialog box (see above), which you access by choosing the Commands command on the Edit menu. The scrolling list on the left side of this dialog box lists every command available in Word. When you select a command on this list, the name of the menu that contains the command or the name of the default menu to which Word would normally add the command is displayed in the Menu pop-up box. The default keyboard equivalent(s) for the command are presented in a scrolling list below the Keys option.

If you're not sure what a particular command does, click on the Help button. If you'd like to print a complete list of Word's commands, click on the List button. To execute any command without adding it to any menus, select it and then click on the Do button.

Selecting a command that's already in one of Word's menus causes the Remove button to appear below the Menu option. You use this button to remove the selected command from its menu. If you select a command that is not already in a Word menu, the Add button appears below the Menu option. To add the command, select the menu you want to add it to, using the Menu pop-up box; select the Auto option to place the command in its default location or the Append option to place the command at the bottom of the selected menu; and then click on the Add button.

The very last entry in the scrolling command list is --- Separator ---. This entry is not really a command but is used to add dimmed lines to your custom menus. Do so by selecting the ---Separator--- entry and using the Add button as described. You can add keyboard command equivalents to or remove them from any command by using the Add and Remove buttons, which are next to the scrolling Keys option.

Once you have completed your customization of Word, you must save your new configuration. To make your customizations Word defaults, give the configuration file the name Word Settings (4) and save it in your System Folder, replacing the current file that uses this name. You can also give your file a different name, but then you'll have to open it by using the Open button in the Commands dialog box each time you use Word.

The Reset button in the Commands dialog box lets you return your menus to their precustomization state (as they were when you began this Word session) at any time. To return to the original Word menus (as they were the first time you ran Word), press Shift while clicking on the Reset button. To add every command in the scrolling list to its default position in the menus, press Option while clicking on the Reset button.

keyboard command equivalents and then to use the Redefine Style From Selection command. After this command

has been executed, all paragraphs to which the style has been applied are automatically updated.

TECHNIQUES

Edit

Undo Typing	⌘Z
Cut	⌘H
Copy	⌘C
Paste	⌘U
Clear	
Edit Again	F8
Glossary...	
Show ¶	⌘V
Preferences...	
Commands...	
Add to Menu	⌘⌥=
Remove From Menu	⌘⌥-
Assign to Key	⌘⌥□+
Select Whole Document	⌘A
Copy Formats	⌘⌥U

Reassign or replace Word's default keyboard command equivalents.

Word provides a tremendous number of keyboard shortcuts, but the Commands dialog box (or the Assign to Key command) enables you to define even more. You can even assign more than one shortcut to a single menu command.

Add the Assign to Key command to the Edit menu.

This command makes it easy to customize keyboard command equivalents. After you have chosen this command, the cursor turns into a command icon, and you select the menu command you wish to assign a new keyboard shortcut — press the keys you wish to assign, and the assignment is done. If you try to assign a keyboard combination that is already in use, Word warns you and lets you either switch the assignment or cancel it and try again.

Add the Add to Menu command to the Edit menu.

This command makes it easy to add documents to your Work menu, saving you the trouble of remembering the keyboard shortcut for the Add to Menu command (Command-Option-=). This command doesn't really save any energy in adding Word com-

mands to other menus because you still have to use the Commands command to access the command list.

Remove the commands you never use.

Undoubtedly there are at least a few commands in Word's standard menus that you never use — in fact, there may be quite a few. If you don't use Microsoft Mail, for example, remove the Send Mail and Open Mail commands. If you don't create tables, remove the Insert Table and Cells commands. You can always replace any commands you remove, and the reduced clutter makes it easier to get comfortable with your new menu structure.

Add the Remove From Menu command to the Edit menu.

To encourage yourself to delete commands, add the Remove From Menu command to your Edit menu. Whenever you notice you aren't using a command that is still in one of your menus or when you want to delete from your Work menu a document that you're no longer using, choose the Remove From Menu command. The cursor turns into a minus sign, and you can just select the menu command you want to remove.

Add the Select Whole Document command to the Edit menu.

People often want to select an entire Word document, but it's hard to remember the keyboard command equivalent (Command-Option-M) or inconvenient to use the mouse-click method (Command-click with the arrow tool at the far left edge of the window). With the Select Whole Document command in the Edit menu, selecting an entire document is no longer a brainteaser. Interface purists will also want to assign it the Option-A keyboard equivalent.

Add the Copy Formats command to the Edit menu.

This is one of Word's most powerful commands and one that almost anyone would find useful if it were easier to use. The Copy Formats command lets you copy formatting from one word, phrase, or paragraph and apply it to another paragraph. If you have set up one paragraph with special indents and tabs, for example, and want to apply these same formats to another existing paragraph, you normally have to define a style based on the formatted paragraph or manually reapply all the formatting to the second paragraph. Alternatively, you can select the formatted paragraph (making sure you've selected the entire paragraph), choose the Copy Formats command, select the paragraph you want to format, and press Enter. Using the same procedure while selecting characters instead of paragraphs copies text formatting such as type style and font.

Document

Open Header...	
Open Footer...	
Footnote...	⌘E
Repaginate Now	⌘J
Outlining	⌘U
Page View	⌘B
Insert Page Break	⇧⤫
Insert Line Break	⇧↵

Add the Insert Page Break and Insert Line Break commands to the Document menu.

Both of these commands are easy to apply, using keyboard command equivalents (Shift-Enter and Shift-Return, respectively), but if you don't use them often, it's far easier to choose them from a menu than to remember them or hunt

Whenever you notice you no longer use a command that is still in one of your menus, choose the Remove From Menu command.

them down through trial and error. Several other Insert commands are available, covering special characters, time and date stamps, and index and table-of-contents entries.

Work

Aa_Letter
Dealer Letter 1
Drawing Proposal
SW Permission Request

Add frequently used documents to the Work menu.

By choosing the Add to Menu command (Command-Option-=) and using the Open command to select documents, you can add a new menu (the Work menu) to Word. When you want to open the document in the future, you simply choose it from the Work menu. This technique is especially helpful for Word documents that you use as templates. (To create a template, save your document and then select its icon in the Finder and choose the Get Info command. Click on the Locked option in the upper left corner, and then close the Get Info dialog box. When you use this document, any attempt to save changes automatically executes the Save As command — you cannot save over the template.)

"*What's in a name?*"

Market for Mass Storage.

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Removable Drives — Reliable Choices

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Both models offer the advantages of transportability, unlimited storage and come with a free cartridge.

Optical / CD-ROM Drives

Beyond magnetic storage, optical technology provides the benefits of prolonged data integrity in a compact, high capacity medium. Ideal for applications such as DTP, CAD/CAM, and multimedia production, the Microtech OR650 rewritable optical drive offers a "leading combination of price and performance" (*Macworld,* March 1990).

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What's in a name?
More than you thought.

A Passion for Quality

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Tape Backup — "Standouts" (*Macworld*, Dec. 1989)

While everyone knows the importance of backup, most backup systems are just too difficult and time consuming. Microtech systems are easy to use and provide for fast protection of your valuable data.

Our T150 Tape Backup System was identified as a "standout" by *Macworld* magazine. And for larger capacity needs, Microtech now offers the *new* T1200 Digital Audio Tape unit with 1200MB of storage.

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TECHNIQUES

6 WAYS TO Fry Your Mac

Although hundreds of high-tech hardware and software add-ons are available, the Mac is still basically a plug-and-play computer. Not much can go wrong with setting up a system, but a few things should be avoided — or you risk destroying your Mac or your work.

1. Plugging in or unplugging a mouse or keyboard with the Mac turned on. If you do this, you run the risk of frying the ADB (Apple Desktop Bus) chip on the motherboard, which results in a dead keyboard and mouse. Repair usually requires replacing the motherboard (a new board for a standard SE costs about $400, plus installation charges).

2. Unplugging SCSI devices with the Mac turned on. This thoroughly confuses the SCSI bus and the Mac. It can ruin files on the hard-disk drive, including the System and SCSI-driver software.

3. Removing or adding SIMMs with the Mac turned on. This can damage the SIMMs as well as the motherboard (and you too, if you touch the wrong things).

4. Using a screwdriver to remove SIMMs. Pulling back the plastic tabs with your fingernails can be trying, but using a screwdriver will break the tabs off, resulting in useless SIMMs that wiggle around in their sockets. AMP ([800] 522-6752) offers a SIMM-removal tool (about $40) that saves both your fingernails and the tabs. Ask for AMP part number 821987-2 at your nearest electronics-parts dealer.

5. Plugging a NuBus card into the PDS (processor direct slot). The IIci and IIfx have a PDS that is faster than their respective NuBus slots. The PDS slot accepts more pins, but you can force a NuBus card into it. Bad idea. We know you wouldn't do this on purpose, but be sure you know what type of card you have before you install it.

6. Cutting a square hole in the upper left corner of an 800K floppy disk so it can be used as a 1.44-megabyte floppy in FDHD SuperDrives. We've actually heard of some cheapskates doing this to avoid the higher cost of the newer floppies. They'll regret it, especially if they use the modified disks as backups. The problem is that you may be able to write on the disk initially, but you may not be able to read the data. The 800K disks are not as magnetically dense as the 1.44-megabyte variety and cannot hold data written in the denser FDHD format.
— **John Rizzo**

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Disk Optimizing: Just Do It

Is the curse of File Fragmentation costing you time and disk space? Are you suffering from Flagging Productivity? Then Disk Optimization is the answer to your prayers.

That might be the pitch of this column if I were selling Disk Optimization, but disk optimization (no caps) is not a product; it's just a stage in disk maintenance. This month we'll look at disk optimization, its benefits, and the file-fragmentation problem that makes it necessary. The good news is that you don't have to buy a thing to optimize your disk, although a good optimization utility can save you time saving time. We'll look at one of those too.

Disk optimization has to do with the physical placement of files on a hard disk, which, it turns out, has a significant effect on system performance. As I mentioned last month, there is little relationship between the directory structure the Finder shows you and the actual physical layout of the hard disk. It's the latter that matters in optimization.

The Mac operating system saves files to a hard disk in 512-byte chunks corresponding to sectors, finding space on the disk for these chunks wherever it can. But it doesn't necessarily store all the chunks of a given file together: It places as much of a file as it can in the first available space on the disk, then the next piece of the file in the next available space, and so on. The contiguous pieces of the file are called extents, and each extent fills some number of 512-byte segments.

By Michael Swaine

What Optimizing Does

System
INITs
free space
Desktop

Disk optimization is still one of the best ways to improve hard-disk performance. Now there's a new optimization program that makes it easier than ever.

All the information needed to maintain this complicated structure of sectors and extents and files is on the disk too, in the hidden structures described here last month. The volume bit map keeps track of the sectors on the disk, recording which are allocated, no matter to what, and which are free; the extents b-tree keeps track of the extents; and the catalog b-tree keeps track of the files themselves.

Breaking up files into extents is smart, because it uses disk space efficiently. If the operating system didn't do this, you might find yourself unable to save a file to a disk even when there was plenty of space for it, simply because the space wasn't contiguous. But the practice does lead to the inefficiency of fragmentation.

Fragmentation prevails when many files on a disk are split up into extents and/or when some files are split into many extents. It slows down access to files as the operating system searches the extents tree, putting the file back together, and it also results in unnecessary movement of the disk-drive head. Mechanical moving parts have the annoying habit of wearing out, so the less physical movement in a computer, the better. The best situation is to have all free space on the disk in one place and each file stored intact.

There is a simple way to achieve this ideal: Just back up the disk; erase it; and restore, file by file. It's deleting files that creates holes in awkward places, leading to fragmentation. By rewriting the disk file by file, you fill it front to back, eliminating file fragmentation and making all the free space contiguous.

This simple solution is a little too simple. The better approach is to use a utility, because there are other housekeeping chores to do, all of which are rightly considered part of optimization. Besides consolidating free space and defragmenting files, you need, for example, to mark bad blocks and to arrange files wisely.

Bad blocks are defective spots on the disk. A good disk-optimization utility locates them, writes dummy files over them, and causes applications to avoid them henceforth. Arranging the files wisely on the disk is important

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because it reduces the need for optimization. A good disk-optimization utility places rarely modified files such as the System file and the Finder at the beginning of the disk and frequently modified but necessary files such as Desktop at the end. Since Desktop is an invisible file, it's useful to have a utility move it.

A good disk-optimization utility also does a better job of optimization than you can, does it faster, doesn't have to erase the disk, and provides you with useful information as it works. An example of a good disk-optimization utility is Norton Utilities Speed Disk.

Do It for Me

Here's a walk-through, using Speed Disk to optimize your hard disk.

First clean up and back up the disk. Cleaning up means getting rid of all the files you don't really want on the disk. No need to optimize them. Backing up the disk before optimizing it is a safety measure. Optimization juggles a lot of data all over your disk, and it's only good sense to make sure it's all backed up before you mess with it. The drawback to backing up just before optimizing is that you are backing up an unoptimized disk; but if you do a file-by-file or incremental backup, this is irrelevant, and in any case, the safety factor is the more serious consideration. Since optimization moves files around, you may need to deinstall copy-protected applications before optimizing and reinstall them afterward.

At this point, you invoke Norton Utilities and click on the Speed Disk button to select the optimizer. First, Speed Disk gives you a picture of the disk, with black pixels for allocated chunks of the disk and white pixels for free chunks. The chunks are not exactly equivalent to the bits in the volume bit map, since the chunk size Speed Disk uses depends on the size of the disk, but the principle is the same. Speed Disk is giving you a pixel map of the allocated chunks of the disk that can help you decide whether to optimize it.

If you next ask Speed Disk to check the disk, it will give you some advice, reporting the percentage of fragmented files; whether free space on the disk is all contiguous; and a rating of the messiness of the disk on a seven-level scale running from No Need to Optimize, on the one hand, to Dangerous Fragmentation, on the other. It also lets you know if the disk's Desktop file or directory are fragmented; fragmentation of these often-accessed files particularly hurts performance.

If Speed Disk recommends optimizing and you choose to follow its advice, you click on another button and Speed Disk optimizes the disk. The pixel map changes dynamically to reflect the new organization of the disk, so you

Shuffle Off to Optimal

| A2 | A1 | B2 | B1 | A4 | A3 | B4 | B3 | |

Figure 1: Messed up

| A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | |
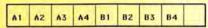
Figure 2: Fixed up

The bit shuffling necessary to optimize a disk can be a puzzle. Here is the puzzle it can be.

Suppose that two files, A and B, are each fragmented into four extents, as shown in Figure 1. A1 is the first piece of file A, A2 the second, and so on, so the desired organization is that shown in Figure 2. Further suppose, for the purposes of this puzzle, that the free space and the eight extents are all the same size, each one-ninth of the size of the disk, and that this is the smallest size the optimizer has to work with. To turn Figure 1 into Figure 2, then, the optimizer has to move the eight extents around in the nine spaces.

You're the optimizer. What is the smallest number of steps, each step consisting of moving one extent from its location to the free space, required to produce Figure 2 from Figure 1? Is there any other arrangement of the eight extents that requires more steps than this to produce Figure 2? The best answer I receive before the arbitrary and unspecified cutoff date will receive one of our coveted "I Beat the System" T-shirts.

can actually watch Speed Disk move data.

The fragmentation percentage needs to be interpreted carefully. On a hard disk used mainly to hold one large, frequently modified database, looking at the fragmentation of that one file is more meaningful than looking at the fragmentation percentage. A large hard disk that is highly fragmented takes longer to optimize than a similarly fragmented 20-megabyte hard disk, naturally, and the time required to optimize is something to take into consideration. Virtual memory requires that a large chunk (8 megabytes) of the disk be set aside for virtual-memory purposes, reducing the actual disk space on an 80-megabyte disk by 10 percent. Virtual memory and disk partitioning both make the disk effectively smaller for optimization purposes, so you might want to optimize the disk more frequently.

Norton Utilities Speed Disk is the disk optimizer I've been using since before its official release. It does the job well, gives me lots of information and advice in a usable form, and lets me operate at any level of control from do-it-and-don't-bother-me to let-me-twiddle-the-bits. But any good optimizer utility should do the job, and if you have a hard disk, disk optimization is a job that you should do.

And that's the real pitch of this column.

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POWER TOOLS

The Seventh-System Stretch

As the long summer afternoon of Waiting for System 7 stretches on, rumors fly and questions pop up. When will I get it? Do I really want it? Will Apple drop some features in order to get the product out this year? Are third-party developers holding up features of new products until System 7 is out? And when I get it, will I begin waiting impatiently for System 8?

From down in the dugout, I'll try to answer them all, in order.

When will I get it?

May 7, 1990. But you probably meant, when will *you* get it? The best guess is January 1991. As Apple's Worldwide Developers Conference approached, developers and Apple watchers were speculating that System 7 wouldn't see the light of day this year and were pushing Apple to announce a firm delivery date.

Apple has now promised third-party developers working on System 7-supporting products that most Mac users will have had a chance to upgrade to System 7 by the first of the year. I think John Sculley will hold Apple to this promise. There's an operating-system war on, with many people claiming that the recently released Microsoft Windows 3.0 is better than the Mac's current system software. Sculley mentioned Windows 3.0 three times in his keynote address at this year's Developers Conference, and you get the impression that he feels that every day without System 7 is a day of lost market share.

Microsoft, which is good with names, has arranged it so that anybody who wants to be considered knowledgeable about operating systems calls Windows 3.0 *Win Three*.

Do I really want it?

Yes. Apple will *make* you want it. But you really should want System 7, because it will be a marked improvement over current System software. The consensus of those who have used it, even with all its alpha-version bugs, slugs, and gooey ughs (by which I mean that it is buggy and sluggish and that there are a few blemishes on the graphical user interface [GUI], all normal for alpha software), is that they can't go back to System 6. The new Finder, in particular, pulls off the neat trick of making the user interface more consistent and unified while at the same time putting more control of the System into users' hands.

Eventually you'll have to use System 7, since it will be the only game being dealt by the only dealer in town. (That's what Apple thinks anyway. I've altered the expression "only game in town" to hint at where Apple and I could turn out to be wrong. Other hints appear toward the end of this piece.)
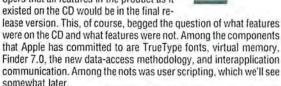
Between now and eventually, Apple is encouraging third-party developers to create "smart binaries": single versions of their products that discern which System the machine is running and perform appropriately under either System 6 or System 7 so that, theoretically, even networks of System 7 and System 6 machines with smart binaries on a server should work. Eventually is probably about two years from now.

That business of smart binaries is important, since for many users, upgrading to System 7 is not free. First, System 7 requires a minimum of 2 megabytes of memory and a hard disk, so any machine not meeting these minimum requirements will have to be upgraded to run System 7. Second, many users will want to take advantage of the virtual-memory feature of System 7, which requires a 68030 machine or a PMMU (a memory-management chip). And third, it's better than a good guess that even machines with 2 megabytes of memory will need to add memory to avoid losing performance.

Will Apple drop some features in order to get the product out this year?

Yes, and every certified developer knows exactly which features, of those announced at last year's Developers Conference as part of System 7, will not be part of the first release.

At this year's Developers Conference, Apple handed out CDs containing alpha versions of System 7 and promised developers that all features in the product as it existed on the CD would be in the final release version. This, of course, begged the question of what features were on the CD and what features were not. Among the components that Apple has committed to are TrueType fonts, virtual memory, Finder 7.0, the new data-access methodology, and interapplication communication. Among the nots was user scripting, which we'll see somewhat later.

Are third-party developers holding up features of new products until System 7 is out?

A lot of people think so. At Macworld Expo in San Francisco last spring, there was a pervading sense of innovation on hold. One reporter said Macworld "lacked innovation"; another could not find "a single significant product." If this is so, Macworld Boston this summer will be even duller than San Francisco.

But ACIUS is not waiting, and its Macworld Expo introductions give a hint of what to expect from what Apple so endearingly calls "System 7-studly apps." In fact, Apple used ACIUS' new applications in demonstrations of interapplication communication at the Developers Conference and also used unreleased Claris software that employed Dave Winer's implementation of interapplication communication, which developers were told is compatible with System 7. Apple itself did not wait for System 7 to introduce the already long-awaited new version of HyperCard. HyperCard 2.0 does not support System 7, although the plan is to release what sounds to me like a System 7-wimpy Version 2.1 along with System 7. Perhaps I expect too much. Oh, and Ashton-Tate didn't wait to provide interapplication communication between its FullWrite and dbMac products.

Reading between the lines in one of Microsoft CEO Bill Gates' public statements, it appears that Microsoft *is* delaying new features in its Macintosh products for System 7. Right, that's the same Microsoft that sells Win Three.

When I get it, will I begin waiting impatiently for System 8?

Yes, but if you're a software developer you may do more than wait. Some features that are important to some people won't be in System 7: True multitasking. Memory protection. Support for real-time processing. User scripting won't be a part of the initial release. System 7 is a major step forward, make no mistake, but it won't supply everything everyone might want in an operating system, and some developers are likely to treat the shortcomings as development opportunities.

Apple claims that the PC world has a confusion of DOS, Windows, and OS/2 while the Mac world will have only System 7. If third-party software developers respond to System 7's omissions by creating their own operating-system utilities, shells, or even alternatives, it may not be that simple.

Make Room for System 7

System 7 is on the way. Here's how to install it and start working smarter at the same time.
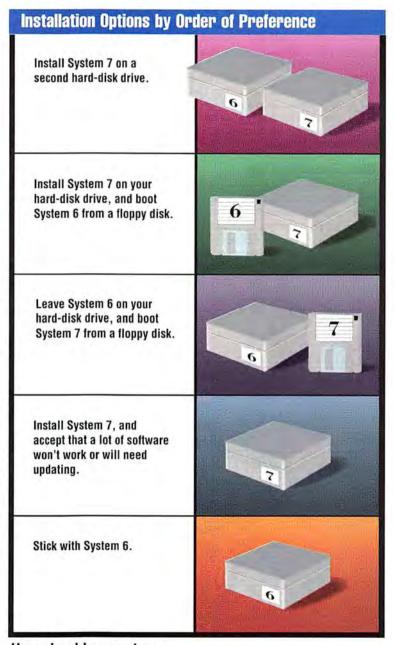
Make no mistake, System 7 is coming soon, and it's time you considered what you're going to do about it. I'm not here to tell you whether you should use it or what features it has — Mike Swaine's been handling that in his Beating the System column. No, I'm here to tell you how (while you're taking the time to install new System software) to clean up your hard disk(s) to help you work smarter. (Well, OK, here's my opinion, briefly stated: System 7 seems more robust than System 6, incorporates some desirable interface changes, and will eventually increase productivity and quality of output. In other words, I'm moving up, and I think you should too.)

First things first: System 7 will not be compatible with some current software. Some new versions of existing software will have problems with the older System 6 or will have capabilities you can't access without the new System, and an increasing number of new programs simply won't work at all with System 6. This forces you to choose either to forgo the advantages of System 7 or to tolerate the problems you'll encounter after changing to it. I've got a better solution: dual disks.

Make a Floppy

It's easy to boot a Mac from a floppy. Indeed, if a floppy disk is present in the internal drive when you first turn on your computer, the Mac attempts to boot from the System contained on that disk, if any. So the low-cost solution is to install the System version you

Installation Options by Order of Preference

Install System 7 on a second hard-disk drive.

Install System 7 on your hard-disk drive, and boot System 6 from a floppy disk.

Leave System 6 on your hard-disk drive, and boot System 7 from a floppy disk.

Install System 7, and accept that a lot of software won't work or will need updating.

Stick with System 6.

How should you set up your Mac to greet System 7? The amount of trouble you have may depend on which option you choose.

By Thom Hogan

plan to use most often (probably System 6 until you confirm that your applications run properly under System 7) on your hard-disk drive and create a boot floppy with the other version.

Unfortunately, if you place System 7 on the floppy boot disk, you'll give up a few things such as System 7's virtual-memory option, which can't be used if you boot from a floppy, at least with the prerelease versions of System 7 I've seen. For this reason, I suggest that you create a System 6 floppy and install System 7 on your hard-disk drive. This means you'll have to boot from the floppy most of the time, at least until things stabilize enough to use System 7 full-time.

Use a Second Hard Disk

Alternatively, you can use a second hard-disk drive or removable media for the two systems. I installed System 7 on my internal 80-megabyte drive and left System 6 on my external 210-megabyte hard-disk drive. I have to select the drive for the boot process in the Control Panel's

Startup Device cdev, which is awkward, but perhaps I'll write a quick little Fkey to take care of this process.

This scheme also lets me organize my applications. Every time I find an application that is compatible with System 7, I move it from the external hard-disk drive to the internal drive. The only applications installed on the internal drive, therefore, are those that work correctly when I boot from that drive.

Likewise, any program on the external drive is still suspect, and I avoid using it if the computer has been booted from the internal drive. The side benefit is that over time the internal drive will become more useful as a boot drive, and the external drive will contain only oddball and idiosyncratic stuff.

If you have a removable-media drive, you simply need to create separate System 6 and System 7 boot cartridges.

If you don't already have multiple hard-disk drives or a removable-media drive, I suggest you buy the cheapest, smallest-capacity hard-disk drive you can find and

use the scheme I've described. Sure, you might pay $300 to $400 for a 20-mega-byte drive that isn't state of the art, but you'll more than make up for the cost by cutting down the aggravation of making the switch between systems.

One Drive Isn't Enough

Don't try to run System 7 with a single hard-disk drive. Not yet, at least. There are just too many variables, and I can almost guarantee that you'll end up in a world of MacFrustration as you encounter crashes, incompatibility problems, and minor annoyances you've never seen before. Just what things System 7 will break I don't know yet, because I'm writing this just as Apple provides the first beta version to developers. All I know so far is that you *will* experience problems.

The alternative is to ignore System 7 and continue with the software you've got. But be aware that System 6 is going to be slowly but surely ignored by developers. Why? Because System 7 provides

new features and capabilities that developers have been waiting for. Some companies have forged ahead on their own and invested money and time in creating interapplication-communication capabilities, kerning and rotated text, and other high-tech goodies, but in the long run, those investments are wasted if the standard revolves around things that come "free" with the computer.

Do It Right

Let's assume you've decided to take the plunge and format one of your hard-disk drives with System 7. If it's a new drive you bought just for the conversion, no problem — just follow the instructions that came with the drive and the new System software, and install away. More likely, however, you plan to install System 7 on a drive you already own that has files on it. Here are the steps I suggest:

1. Back up the files currently on the hard-disk drive. Personally, I don't use a backup program. Since I have a pair of Bernoulli 44-megabyte drives attached

to my Mac, I simply do Finder copies of about 40 megabytes of files at a time. Making backups this way takes a minimal amount of time, usually fewer than 15 minutes per cartridge. Moreover, I end up with cartridges with files on them that are directly usable by the computer, and I often put a minimal System Folder on each cartridge so that I can boot from it if necessary. I can't count the number of times this method of backup has saved the day for me (since I do a lot of product testing, I crash my machine more often and in ways that are nastier than you're likely to encounter). If worst comes to worst, I can always boot off a cartridge, reformat the hard disk, and then do a Finder copy to restore the hard disk. (Irony of ironies: Last night I saved a draft of this column. This morning I booted the machine, and it couldn't find the hard disk! Yup, out came a Bernoulli cartridge. I booted from that, found that the Startup information on the other drive had been corrupted, replaced it, and — voilà — my Mac was restored.)

But I'm getting off the track — the point is that, before doing anything else, you should make sure your System is backed up *in full*. That way, if you make a mistake or decide you want to go back to the way things were, you can restore everything easily. *Do not skip this step!*

2. Reformat your hard disk. Yes, reformat it. And I don't mean by selecting the Erase Disk command from the Finder's Special menu. Use the low-level formatting utility that came with your hard disk (for Apple-supplied drives, that's HDSetup). Doing this often catches marginal or defective sectors that can cause major problems later. This is especially important if you use your Mac in an environment that changes dramatically (because of temperature or humidity extremes, for example) during the year. Temperature changes can affect the exact placement of the head mechanism by minute amounts that can show up as problems writing to disk.

For example, consider the following worst-case scenario. You formatted the

drive in a horizontal position in no humidity when the drive was cold and the room temperature was 65 degrees. Since then you've used the drive for a year and turned it on its side, and because of the summer weather, the room is now 80 degrees with high humidity. Not only that, but your Mac has been on for ten hours and the internal temperature is relatively high (say 100 degrees). You don't need a Ph.D. in physics to know that there's absolutely no chance that the heads are positioned exactly the same way they were when you formatted the drive. Usually, however, the small differences in track positioning are within the drive's tolerances and you don't notice any problems, but eventually under such conditions, you're likely to get a bad-sector message.

The solution is to reformat and repopulate the hard-disk drive periodically. Since you're about to install a new System, now is as good a time as any to do so. Two hints: Always format a drive in the position in which it is going to be used (horizontal or vertical), and never format a drive that's been on for less than 15 minutes.

3. Install System 7. Once the drive's been checked and erased, you're ready to do the steps outlined by Apple in its documentation.

4. Add fonts, DAs, and INITs. Anything that goes into your System Folder should be installed next. Test each item after you've installed it. Installing the System Folder stuff first and all together makes the boot process as fast as it can be, because if all the fonts and INITs are in the same general portion of the disk, the head doesn't have to move much, if at all, during the boot process to load them; drive-head movement is the slowest aspect of disk-drivedom.

5. Make two additional folders on the desktop: Applications and Data. I'm a firm believer that you not only need to optimize the positions of files on a hard disk but that you must also organize a disk to make it convenient to back up and restore. By separating all your applications from the data on your drive, you will save yourself an enormous amount of time maintaining your system, as you'll see later.

6. Install all System 7 applications into the Applications folder. Make additional folders to organize the programs, if necessary. I group applications by type, so I have a WP folder, a DP folder, a DB folder, and the like. The better organized the contents of your drive are, the easier it is to find and maintain files.

7. Move your data files into the Data folder. Again, use additional folders to group related data. Instead of putting all the word-processing files into a WP folder, however, consider making a folder for each *project* you work on. For example, I have a folder named Articles, in which I have folders for *MacUser*,

Macintosh II Report, and so on. These folders contain files of many different types — word processing, spreadsheet, database, and graphics, for example — but all are related to one project.

If you're moving your data back onto the hard disk from your backup set, you'll have to perform a selective restore operation at this time.

8. Back up your drive. Again? Yes, indeed. You should always have a backup of your current configuration (and one of an older configuration that you know was stable). But note a few things about disk organization that make backups easier. First, you can create a backup set that includes only the System and Applications folders. The files in these folders normally don't change. You might add new files to these folders from time to time, but those files are ones that don't change and can usually be reinstalled easily from the disks supplied by the publisher. Label this first backup set "System."

Next, back up the Data folder. Label this backup set "Data." These are the files that are likely to change, so you'll also want to set your backup program to perform incremental backups on this set. Because you've organized your hard-disk drive carefully, specifying the files to be incrementally backed up is no longer a game of browsing through every folder to remove nonessential items such as preference files. Believe me, this method saves time and energy, and should you ever need to restore your disk, you'll be able to restore it exactly as it was before (with System files stored first on the disk, followed by applications, followed by data).

9. Create an alternative boot method. If you have two hard-disk drives, make sure each one has a System Folder on it and can be booted. If you use removable-media drives, make sure you have a cartridge with the new System Folder on it and label it "Emergency Boot."

If you have only one hard-disk drive, create a floppy disk with a minimal System Folder on it and label it "Emergency Boot." I can guarantee that someday you'll find that your machine can't be started from the usual drive. That's when you'll appreciate having taken the time to perform this step.

That's it. You now have an organized, error-checked hard-disk drive with System 7 on it, a complete backup of the drive, and an emergency boot method for

the day when things don't seem to work. Sure, it took a little longer to produce than if you had just crammed System 7 onto your hard disk the easiest way, but in the long run, you'll have a more secure system and you'll save time in finding files and archiving them.

Thom Hogan is publisher and editor of *The Macintosh II Report.* You can obtain a sample copy by sending $2 to Thom Hogan Publishing, 329 Horizon Way, Pacifica, CA 94044.

Let's Get Lost

Once in a while, every Mac user needs a little privacy. Do you have something to hide? Then Loser is the answer.

Figure 1: Vanishing Act

Figure 1: Loser makes the icon of a file invisible to the Finder.

Loser is a simple application that sets or clears a file's invisible-attribute bit. When this bit is set, the Finder pretends the file isn't there. It won't draw the file's icon on the desktop or report its name in a directory listing. The effect on the desktop is that the file is lost, or just not there. Loser can, of course, make the file visible again by clearing the bit.

The technique isn't foolproof. Other programs that read and display directory information, such as ResEdit and DiskTools II, ignore this bit and reveal the file's existence. But Loser gives you a first line of defense against the average snoop.

Loser's simplicity in the software-application layer, where it sets or clears the bit, gives us an ideal opportunity to examine user-interface mechanics. This month we'll cover the Standard File Package, a set of routines and structures supplied as a PACK resource in the System file; take a look at adding controls to dialog boxes; and explain the use of hook procedures in C. But let's begin by discussing Loser's origins, which should shed some light on design-process dynamics.

MacUser's Security

Loser is part of a set of utilities called MacUser's Security that you can find on Zmac, the *MacUser/MacWeek* on-line service. Code of the West (Kurt's software-engineering

By Kurt W. G. Matthies and Thom Hogan

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BYTE, January 1990

Given that 4 D was the first program to allow database designers to build a Macintosh interface, Acius has the advantage of experience over its competition.
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company) developed this trio of programs exclusively for *MacUser*. Security also contains Shredder, which permanently deletes files by shredding them, and Scrambler, which password-encrypts your files with the same DES algorithm that's used to protect our national secrets. To download Security from Zmac, type GO ZMAC at any CompuServe prompt and look in the MacUser Power Tools Download section.

Designing for Fun and Profit

When Code of the West contracted with *MacUser* to write MacUser's Security, we were presented with a *program-requirements document*. This document was informal, consisting of a paragraph describing what each utility should do. Informality is OK — the essential element of a requirements document is *completeness*. Design shouldn't begin before *all the requirements* are down on paper.

Once the requirements were agreed on, we began the design by developing a *functional specification*. The purpose of this document is twofold. First, it defines what the program should do, how its user interface should look, and what its major features should be, thereby providing you and your client with a written description of the finished product. Second, it serves as a platform from which you can come to a mutual understanding of what the deliverables comprise.

The functional specification also provides your first opportunity to consider implementation details. To write the functional spec, you need to do a preliminary design, which is where you consider alternative strategies for meeting the requirements, before you sit down to write a line of code. Program structure is worked out at this stage, as is a rough cut at the hows and wheres of key passages in the code. Any form you choose for this design is OK — pseudocode, flowcharts, data-flow diagrams, or Buhr diagrams — whatever form makes sense to you and the project. The important thing is that you write it down. Taking the time to think the details through before you commit them to code and writing them down so that you stay on track can save you time overall.

The Loser Interface

Because Loser does so little in the application layer, the design issues naturally focused on the user interface, which has two requirements. First, a file needs

Figure 2: The Loser dialog box

Taking the time to think the details through before you commit them to code can save you time.

to be selected for losing or finding. Our first impulse was to use the Finder for file selection — Mac users are familiar with the desktop's point-click-drag selection techniques — and hide the selected files. This solution raises a few questions, however. How do you find invisible files? Because invisible files' icons don't appear on the desktop, the application needs another way to select these files. Why support two modes of selection? Another problem with this solution is that the Finder has no documented programming interface. How do you know which files are selected on the desktop?

The only application we're aware of that reads the Finder's memory and determines which files are currently selected on the desktop is Aladdin's Magic Menu, a utility that extends the Finder's capabilities. The engineers at Aladdin discovered the technique of finding the Finder's selected files by searching through the Finder's data structures only after hours of arduous debugging and rummaging around in RAM — a grim prospect. This technique also has a tenuous future: Aladdin will have to react to changes in the Finder with each release of System software. So, an apparently slick interface has the potential to become a maintenance nightmare.

For these reasons, we decided to simplify the interface and not use the Finder for file selection. Instead, we chose to use

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Creating the Loser Dialog Box

The SFGetFile dialog box of the Standard File Package contains buttons, a list box, and other controls for file-system navigation — and its procedures expect these items to be in the proper order. You can, however, customize this dialog box by appending new items at the *end of the list.* Loser's dialog box needs three additional items: a title and two radio buttons. Although the modified DITL resource is included with the complete source code for Loser, you might be interested in how to modify it yourself.

Using ResEdit (version 1.2 is the current release), open the System file and Loser's resource file. Make sure you read the warning you get when you open the System file: Tread lightly in here. In the System window, you'll see a list of resource names — four-character tags for the various types. Find the one named DLOG, and double-click on it to reveal all the dialog-box templates the System contains. Find template number –4,000, select it with a single click, and select Copy from the Edit menu to place a copy of the template on the Clipboard. Now select the Loser resource file by clicking on its window, and paste the template into it. Repeat this process for DITL –4,000, copying the template from the System file and pasting it into the application's resource file.

You now have all the necessary resources in Loser's resource file, so you can close the System file by using the go-away box in the upper left-hand corner of the appropriate windows. ***Don't save any changes in the System file!*** If you've inadvertently modified the System file, perhaps by selecting Cut instead of Copy, you'll get the "Are you sure you don't want to save?" message. The purpose of this exercise is not to modify the System, so don't save changes here. You might do some serious damage.

You should be working exclusively with the Loser resource file now. The one thing you need to do is renumber these new resources. Navigate to the new DLOG, and renumber it 65. You do this by finding it, selecting it (again with a single click), and using Get Info in the File menu. You are presented with a dialog box that lets you change the number and ID of the resource. If you already have this resource in your file — because you're working on the Loser resource file that we have supplied for you on Zmac or by mail order — then ResEdit won't let you set this number to 65. Never fear — use 66 in this case. Next renumber the DITL resource in the same manner, either to 65 or to 66, so it matches the DLOG's ID.

The next thing you need to do is link the DITL to the DLOG. Open the DLOG (65 or 66) and select Display as Text from the DLOG menu. In the dialog box presented, change the value of the itemsID field to the same number you just assigned to the DITL.

Next, you'll be enlarging the window to make room at the bottom for the controls. You can do this in two ways, but because you're looking at the text representation of the DLOG, it's easiest to enter the numbers into the edit boxes. The values for Loser's window are top, 32; left, 46; bottom, 312; and right, 388. While you're in there, make sure the procID field is 1. This field defines the window type that the Window Manager will draw for the dialog box. Figure A shows the complete contents of the box.

Now select Display Graphically from the DLOG menu. You should be looking at a mini-representation of the dialog-box window on a Mac screen. Isn't ResEdit cute? Double-click on this window, and the DITL contents should zoom into a full-sized window for editing. All the items in this particular DITL have to be in the list and in the right order, or the Standard File Package won't know what's what. There are even a couple of items off-screen that you don't see.

Every item has a DITL list number to identify it. Try double-clicking on the Cancel button. You will be presented with ResEdit's DITL-item-editing dialog box. The title of this window is "Edit DITL Item #3" because this item is number 3 in the DITL list. SFGetFile knows that the Cancel button is #3 because it was compiled into the package back in Cupertino, long before any of us were born. Please don't change the order of the controls.

The window should match what you see in Figure B. When you've finished looking, close it with the go-away box in the upper left-hand corner.

Next comes the painful process of moving all the existing items down in the window to make room for Loser's title. You do this by selecting each item one by one (single-click on the item) and dragging. Selected items have a highlighted "handle" at their lower right-hand corner. Try to keep all items in the same relative location, but move them downward about three-quarters of an inch (60 pixels or so). For finer tuning, you can choose to double-click on an item and enter the local coordinates in the DITL edit window.

This ResEdit DITL edit window (Figure B) is the interface you use for both editing and creating new items. Items are assigned sequentially. The next free item in the SFGetFile dialog box is #11, so Loser will use items 11, 12, and 13 for the dialog-box title, the Lose File button, and the Find File button, respectively. Item 11, the title, is a
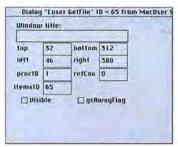
Figure A: The SFGetFile DLOG template in text mode
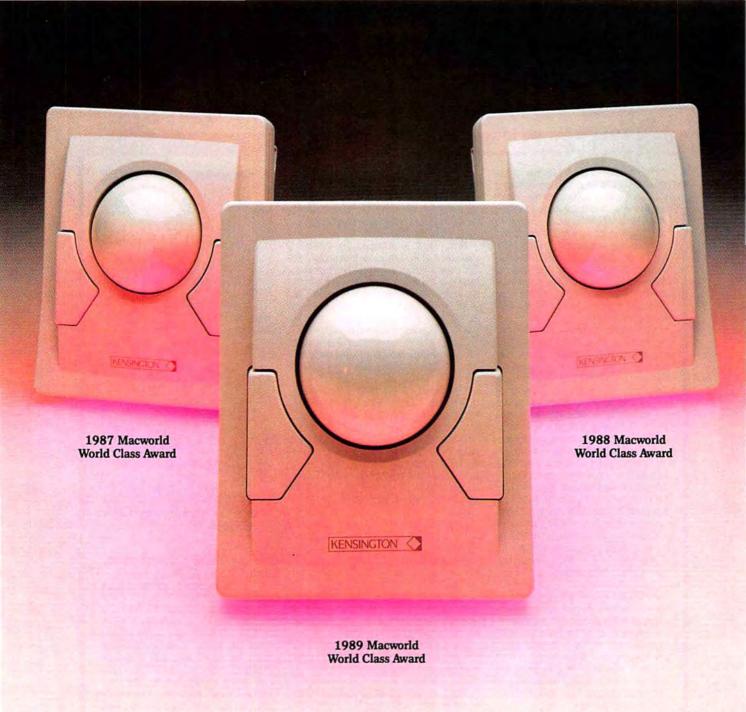
Figure B: The DITL edit window for the Cancel button

static-text item; items 12 and 13 are radio buttons named Lose File and Find File.

Once you've moved the existing items out of the way, it's time to create the new ones. Selecting New from the File menu creates the next item in the list. It opens the DITL edit window and always defaults to a standard button. Select the Static Text button on the left hand side of the edit window, to make the title a text item. Now type "Loser loses found files and finds lost ones" or any title of your choice in the edit box. This text will go into your title. Click in the go-away box to close the edit window. The new title should appear, smack-dab in the middle of the window, about the size of the OK button. Drag the item to the top of the window, and resize the bounding rectangle with the small gray handle in the lower right corner. The text will flow into this space.

Next, one at a time, create the radio buttons. Again, select New, set the control's type to *radio control* in the DITL edit window, and name the buttons Lose File and Find File. As before, you'll have to size and place the items in the larger dialog-box window.

Once you've added all the new items, make final adjustments to the items in the dialog-box window, save, and quit.

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the Standard File Package's routines, which are provided for just that purpose.

The second design issue we had to deal with was that once a file has been selected, Loser needs to know whether to hide a visible file or display an invisible one — that is, to set or clear the invisible-attribute bit. Again we were faced with various design alternatives. One solution was to have Loser simply toggle the file's bit. Alternatively, it could use a modal interface, in which users would select either the Lose File or the Find File mode, explicitly directing Loser to set or clear the bit.

Although the two solutions had equal merit, the preliminary design showed that the modal method was easier to implement. So we designed Loser to have two *radio buttons* — named Lose File

and Find File — appended to the bottom of the **SFGetFile** dialog box for mode selection. And for further emphasis of the mode, Loser renames what would normally be called the Open button as Lose when in Lose mode and as Find when in Find mode. Figure 2 shows the Loser dialog box with its parts.

The Standard File Package

Once you've nailed down the design details, it's time to think about coding. Much of the coding job can be simplified by use of the Standard File Package. This set of routines provides functions that navigate through the file system and return the user's file selections, thus freeing programmers from the burden of learning file-system organization.

One of the Standard File Package's

Example 1: The `SFReply` Structure

```
typedef struct SFReply
        {
        char            good;
        char            copy;
        long            fType;      /* array[1..4] of char; */
        int             vRefNum;
        int             version;
        unsigned char   fName[64];
} SFReply;
```

Example 2: The Prototype for Package 3's `SFPGetFile`

```
void SFPGetFile (Point where, StringPtr prompt, ProcPtr fileFilter,
        short numTypes, SFTypeList typeList, ProcPtr dlgHook,
        SFReply *reply, short dlgID, ProcPtr filterProc);
```

Example 3: Declaring a Hook Proc

```
pascal void
foo (char a, char *b)
{
...
}
```

Example 4: `loserGetFileFilterProc`

```
static  pascal uchar
loserGetFileFilterProc (paramBlkPtr)
        FileParam * paramBlkPtr;
{
        Boolean         invis;
        pBoolean        result;

        invis = (paramBlkPtr->ioFlFndrInfo.fdFlags & fInvisible) ? true:false;

        if (sLoseMode)               /* in lose mode, show visible files */
                result = invis;
        else
                result = invis ? false : true;

        return (result);
}
```

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main routines, **SFGetFile**, is normally called after a user has selected Open from the File menu. **SFGetFile** displays its dialog box, along with the appropriate filenames in the dialog box's list box; interacts with the user, calling routines in the Dialog Manager directly; and returns all necessary information about the selected file — one call does it all.

When **SFGetFile** returns, the user has either selected a file or canceled the operation. This information is returned in the form of an **SFReply** record that contains the result of the user's selection. (Your application has to pass the address of an **SFReply** record to **SFGetFile**.) Example 1 defines the structure of the **SFReply** record.

The **good** field of the structure is **true** (has a value of 1) if the user selected the Open button or **false** (0) if Cancel has been selected. If **good** is **true**, then **vRefNum** specifies the volume ID of the file and **fName** contains the filename. The other fields of the structure can be ignored. With a volume ID and filename, you have enough information to open or, in our case, access a file's volume information.

Loser does more than open a file, though, so we need to modify both the dialog box and the **SFGetFile** actions. First, we need to display and manage two radio buttons — Lose File and Find File. And we want Loser to display visible filenames in the dialog box's list box when the Lose File mode is active and, conversely, to display only the names of invisible files in Find File mode.

SFGetFile uses a dialog-box template — a DLOG resource from the System file — that contains information about the standard items in a dialog box. Loser needs additional items — the radio buttons and a dialog-box title. Now, you can't modify the dialog-box template in the System file — unless you want every other application on your disk to have Lose File and Find File buttons appended to the bottom of *their* open-file dialog boxes.

The technique for appending items to a standard System dialog-box template calls for copying the template into your application's resource file and then modifying the copy. ResEdit is the best tool for this job. If you're interested in knowing how to do this, see the "Creating the Loser Dialog Box" sidebar.

To let you create your own version of the open-file dialog box, Apple provides

another procedure, **SFPGetFile** (the P is for *programmer*), which has all the functions of **SFGetFile**, with the distinction of accepting an alternative dialog-box ID. **SFPGetFile** accepts nine parameters, one of which is the ID for your dialog-box resource.

Three of the parameters are pointers to functions, and when you supply them,

Source-Code Sources

Code by Modem

You can get a copy of all the code for this month's column from the Zmac on-line service by logging on to CompuServe and typing GO ZMAC at any ! prompt. Once you're on Zmac, you'll find the code in the MacUser Power Tools Download section.

If you don't subscribe to CompuServe, you can sign up for Zmac on-line by following these directions. You'll need a modem and telecommunications software. Set your format for 8 bits, one stop, and no parity.

Find your local access number. Dial (800) 346-3247. When you're connected, press Return.

At the Host Name prompt, type PHONES.

Follow the instructions to locate access numbers in your area. Hang up.

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You'll see the following prompts on-screen (your responses are printed here in **boldface** type):

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Password: **Z*MAC**
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POWER TOOLS

they add the capability you need in order to manage the radio buttons and filter the filenames displayed in the dialog box's list box. These arguments, which are defined as type **ProcPtr**, are shown in Example 2.

Hooks and Hook Procs

The slot in which this callback capability is provided — callback being the ability of a System procedure to call an application-defined function from within a Toolbox routine — is known in Macspeak

```
Example 5: The Structure of a DITL Item
struct ditlItem
{
        Ptr        ptr;
        Rect       bounds;
        char       type,
                   length,
                   data [255];
}
```

```
Example 6: loserGetFileDlgHook
static   pascal int
loserGetFileDlgHook (item, dialogPtr)
        short      item;
        DialogPtr dialogPtr;
{
        short                itemType;
        Rect                 box;
        ControlHandle        loseButton, findButton, okButton;
        Boolean              changed;

        /* get the control handles */
        GetDItem (dialogPtr, kLoserLoseButton, &itemType, &loseButton, &box);
        GetDItem (dialogPtr, kLoserFindButton, &itemType, &findButton, &box);
        GetDItem (dialogPtr, getOpen, &itemType, &okButton, &box);

        if (sSFProcFirst)    /* initialization block */
        {
                SetCtlValue (loseButton, sLoseMode ? true : false);
                SetCtlValue (findButton, sLoseMode ? false : true);

                sSFProcFirst = false;            /* clear the semaphore */
        }

        switch (item) {
                case getOpen:                    /* the standard items */
                case getCancel:
                case getEject:
                case getDrive:
                case getNmList:
                case getScroll:
                        break;

                case kLoserLoseButton:                     /* my items */
                        if (GetCtlValue (findButton))
                        {
                                SetCTitle (okButton, "\pLose");
                                SetCtlValue (loseButton, true);
                                SetCtlValue (findButton, false);
                                sLoseMode = true;
                                item = 101;
                        }
                        break;

                case kLoserFindButton:
                        if (GetCtlValue (loseButton))
                        {
                                SetCTitle (okButton, "\pFind");
                                SetCtlValue (loseButton, false);
                                SetCtlValue (findButton, true);

                                sLoseMode = false;
                                item = 101;
                        }
                        break;
        }

        return (item);

} /* loserGetFileDlgHook */
```

as a *hook*, and the function called from the hook is called the *hook proc*. The Toolbox has many hooks, and most programs use hook procs to implement a slick, new interface feature.

We'll venture to say that hooks are responsible for the overwhelming success of Macintosh software. In fact, Macintosh programs would still look like MacPaint and MacWrite 1.0 without them.

Toolbox calls, including Packages, are written to use Pascal calling conventions, and C and Pascal are *very* different in their conventions. So C functions that are destined to be hook procs must be declared with the **pascal** keyword, as in Example 3.

Loser's Use of Hook Procs

Loser uses the three hook procs in **SFPGetFile**. The **fileFilter** proc is used to choose the filenames to display in the dialog box's list box. Called for each file in the current folder, this proc returns a value that tells **SFPGetFile** whether or not to display the particular file. For example, Loser only displays invisible files when it's in Find File mode and visible files when it's in Lose File mode.

Example 4 contains the code for **fileFilter**. Passed a pointer to a file-system data structure for each file that the Package finds in the current folder, **fileFilter** uses the **fndrInfo** member of the file-parameter-block data structure to figure out whether or not the file is visible. It then returns an appropriate value based on the current lose-file/find-file state stored in the global variable **sLoseMode**.

If **fileFilter** returns 0, the file is displayed in the list; if **fileFilter** returns 1, the file is not displayed. Note that the return type is a Pascal **Boolean**, which corresponds to a **char** data type in C. This means you must return an 8-bit value **(0x01)** and not a 16-bit value **(0x0001)** as you might expect.

filterProc is actually a Dialog Manager hook, and it responds to dialog-box events that occur within the Dialog Manager routine **ModalDialog**. This hook proc detects the Return key or the Command-period-key combination, which respectively accept or cancel the dialog box. Users have become accustomed to dialog boxes behaving this way, and most applications support this keyboard shortcut.

```
Example 7: doLoserGetFile

static short
doLoserGetFile      (docParamsPtr)
        DocParamsPtr        docParamsPtr;
{
        short               result;
        SFReply             reply;
        Point               aPt;
        Str64               promptStr;

        sTypelist [0] = 0;

        aPt = dialogTopLeft (kLoserGetFileDLOG); /* center the dialog */

        sSFProcFirst = true;                /* initialize semaphore */

        GetIndString (promptStr, kMsgStrID, kMsgPromptStr);
        SFPGetFile (aPt, promptStr, loserGetFileFilterProc, -1, sTypelist,
                loserGetFileDlgHook, &reply, kLoserGetFileDLOG, nil);

        if (reply.good != true)
                result = false;         /*  cancel button */
        else
        {
                BlockMove (reply.fName,
                        docParamsPtr->fileParams.fileName,
                        (Size)(1 + reply.fName [0]));
                docParamsPtr->fileParams.volRefNum = reply.vRefNum;
                result = true;
        }

        return (result);

} /* doLoserGetFile */
```

Dialog-Box Item Lists

Before we discuss **dlgHook**, which manages the radio buttons, it's important to understand how the Dialog Manager associates items with a dialog box. The definition of a dialog box always includes a dependent *item list* — a DITL resource that contains the buttons, check boxes, text items, ICONs, PICTs, and other items that will appear in the dialog box. When the dialog box is created during program execution, the Dialog Manager loads items in the list and allocates them in the heap.

The item data structure is designed to be versatile enough to account for the variety of types that can appear in a list. It contains a pointer, a bounding rectangle, a type-declaration byte, and an array of additional data for the item. The structure looks something like that shown in Example 5.

The **type** field identifies the item record, and the content of the **data** field depends on this type. For resource-based controls, ICONs, or PICTs, the **data**

field contains the item's resource ID; for text items, the **data** field contains the text. For buttons, check boxes, and radio buttons, such as those in the Loser program, the **data** field contains the control's title.

But because this data structure is considered internal to the workings of the Dialog Manager, you should never access any of its fields directly. Instead, use the Dialog Manager function **GetDItem**, which returns the type, bounds, and relevant data for a particular item. Each item in the list has a reference ID number, and it's this ID that's used to specify the particular item.

Managing the Radio Buttons

Radio buttons are controls. These buttons are managed with the services of the Control Manager. Each control occupies memory and has a corresponding **ControlHandle** with which you access the control and set or read its value. The **dlgHook** proc **loserGetFileDlgHook()**, listed in

Example 6, first gets the control handles of the two radio buttons and the OK button with **GetDItem**. The proc then initializes the control's values to reflect the current state. Because this function is called repeatedly for each event, Loser uses the static variable **sSFProcFirst**

as a semaphore to detect the first time through the routine for initialization of these values. The semaphore's value is set (to **true**) before the dialog box is invoked and is cleared (to **false**) at the end of the initialization block.
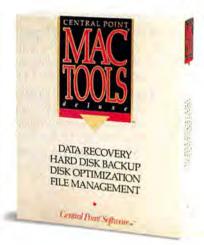
The event-parsing switch that follows

```
Example 8: The Heart of a Loser

if (doLoserGetFile (&docParams))
{
        fileName = docParams.fileParams.fileName;
        volRefNum = docParams.fileParams.volRefNum;

        if (err = GetFInfo (fileName , volRefNum, &fndrInfo))
                doFileCantAlert (fileName, kRead, err, "\pGetFInfo");
        else
        {
                if (sLoseMode)
                        fndrInfo.fdFlags |= fInvisible;
                else
                        fndrInfo.fdFlags &= ~fInvisible;

                if (err = SetFInfo (fileName, volRefNum, &fndrInfo))
                        doFileCantAlert (fileName, kWrite, err, "\pSetFInfo");
        }
}
```

is entered for every event and detects events in the controls. When an event occurs in one of Loser's radio buttons, the application sets that control's value to 1 and sets the value of its complement to 0. The text in the OK button is also changed to reflect the current state. Finally, the hook proc returns the magic number **101**, telling the Package that all is well — Loser has handled the event. If the event occurs in one of the Standard File Package's items, then this function returns the item number so that **SFPGetFile** can go ahead and process the event.

doLoserGetFile(), shown in Example 7, is the function that manages Loser's interface. After doing some initialization, this function calls **SFPGetFile**. Note the use of the **DocParams** structure to pass file information among functions.

Heart of a Loser

The code in Example 8 sketches the essence of the program Loser. When **doLoserGetFile()** returns with a mode and a selected file, Loser calls **GetFInfo** to fill the **FInfo** record with current data for the specific file. Hiding or displaying the file is simply a matter of setting or clearing the bit in the **fdFlags** field, based on the value of the static variable **sLoseMode**. Loser then calls **SetFInfo** to rewrite the entire record in the file system.

The Beatles Were Right!

As a teaching tool, Loser provides many useful examples. As an effective utility, however, it's a loser. When you use the program under MultiFinder, you'll find that files get out of phase with the value of their invisible bit — visible files that you've made invisible haven't disappeared, or invisible files made visible by Loser haven't reappeared.

To reconcile the matter, you must close the folder and reopen it — a small price to pay, but nonetheless an annoying anomaly. This is, as stated earlier, because the Finder is the master of the desktop, and there's unfortunately no method yet discovered of telling the Finder that you've changed the invisible bit and that it should therefore refresh the folder's display.

So perhaps we've traveled this road only to discover that the program is paltry and the concept corrupt. Is Loser lost as a useful utility? We don't yet know — the jury is still out. We've sent an SOS to some of the best developers we know to see if they can come up with a hack to bridge the Loser gap.

We'll report on their efforts to nix the nescience of the phlegmatic Finder in a future column. So until then, we're stuck with our lot of Loser's lack. Or are we? Are any of you willing to take up the gauntlet? (And, can anyone stand another alliteration?) We'll be checking our mailbox.

Tip Sheet

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Tips and
Tricks

✉ **Send tips to**
Tip Sheet, c/o MacUser
950 Tower Lane, 18th Floor
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MacUser pays at least $25 for
every tip used, and the Tip of the
Month earns $100.

Keyboard

Here's a simple tip for those of us with pre-Plus keyboards, which don't have numeric keypads: Use a macro program to redefine the backslash (\) key to be a plus sign (+). This saves a whole lot of shifting in spreadsheets, calculators, and other frequently used programs and basically doesn't cost you anything, since you seldom need to use the backslash key — unless you're running MS-DOS.
Warren Sirota
Oakland, CA

SmartArt

Although it's possible to place AutoCAD drawings (from an IBM PC) into Page-Maker documents on the Mac, there's no screen preview — only a cryptic gray bounding box. Here's a procedure, using SmartArt from Adobe, that provides on-screen viewing of the CAD drawing in Page-Maker. The process may seem rather involved, but it really only takes a few moments and the results are well worth the effort.

1. After you complete the drawing in AutoCAD (version 10), go to your Auto-CAD setup menu and change the plotter driver from whatever you normally use to Post-Script Plotter Driver. Be sure to set the resolution to 2,500 dpi if you plan to output the final PageMaker document to a Linotronic.

2. Plot the drawing to disk (you have the choice in Auto-CAD of plotting to a printer or to a disk).

3. Using a Macintosh-to-PC file-transfer utility (I use MacLink Plus by DataViz), transfer the plot file to the Mac.

4. Create a new Illustrator 88 document. Place the Auto-CAD plot file into the Illustrator document with the Place command from the File menu. An empty box with an X through it will appear on-screen. The box will be about the same size as the original CAD drawing. At this point, you can rotate the box if you need to.

5. Save this Illustrator document, using the Save As command. Click on the option for including a preview for Macintosh, and be sure to click on the "Include copy of placed Encapsulated Post-Script file" check box.

6. Using the SmartArt DA, open the Illustrator file. A gray box will appear in the Smart-Art window. Click on the Reimage button. SmartArt will send the Illustrator file to your PostScript-compatible laser printer for translation and reimaging. When it has finished this process, a good screen representation of the original CAD drawing will then appear in the SmartArt window.

7. Save the document (SmartArt won't ask you to rename it unless you choose Save As). The document is now ready to place in a Page-Maker document with Page-Maker's Place command. The drawing will be completely visible and ready to output to your laser printer or a Linotronic. The drawing will be embedded in the PageMaker document, which means you don't have to provide your Linotronic service bureau with associated graphics files along with your PageMaker document.
Bob Selzer
Orange, CA

Suitcase II

If you can no longer remember which of your fonts

Tip of the Month

PageMaker 3.02

How can you get true fractions such as $1/2$, $1/4$, and $3/4$ in PageMaker from an Adobe type package, such as Garamond, that contains these fractions as separate characters? You cannot ordinarily access them from the keyboard — yet the character list that accompanies some of Adobe's typeface packages shows fractions.

The answer lies in Page-Maker's Aldus Prep file, which can be modified (using Microsoft Word and a program such as ResEdit that lets you change the file attributes).

1. First make a copy of your Aldus Prep file, and insert the original version into a separate folder for safekeeping.

2. Launch Microsoft Word. Hold down the Shift key, and select Open Any File from the File menu. This lets you open Aldus Prep.

3. Find the following code, and change **/AE** to **/threequarters**, **/OE** to **/onequarter**, and **/oe** to **/onehalf**.

4. Now save the file as text-only, and quit from Word. Open ResEdit. Go

What you'll see:

Æ œ Œ

What you'll get:

¾ ½ ¼

Figure 1: You can coax fractions out of some of Adobe's typefaces (such as the Garamond family) if you make some changes in the Aldus Prep file. What you see on-screen (top) is not what prints out (bottom).

to the folder that contains your new prep file, select it, and select Get Info. The file attributes will be TEXT and MSWD. Change these to ALDP and ALD3. Close, save the changes when prompted, and put the new prep file into your System Folder or into the same folder as PageMaker (make sure the new prep file is named Aldus Prep).

When you type Option-Q, Shift-Option-Q, and Shift-Option-", you'll produce $1/2$, $1/4$, and $3/4$ when you print to a PostScript printer (see Figure 1). The fractions won't appear on-screen, however.
Stephen E. French
Jasper, IN

Compiled by Gregory Wasson

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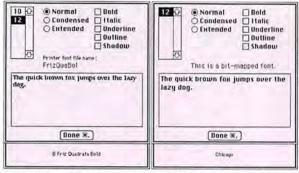
Figure 2: If you've got so many fonts that you can't remember whether a certain one is PostScript or bit-mapped, Suitcase II can clarify the situation.

are bit-mapped and which are PostScript, you can use Suitcase II to find out.

Select Suitcase II from the Apple menu, and click on the Fonts radio button or type Command-F. Select any font name and click on Show, or double-click on a font name.

Above the sample text, Suitcase will list the printer-font filename if the font is PostScript (see Figure 2). If the font chosen is a bit-mapped font, the message "This is a bit-mapped font" will appear.

Michael Conley
Palm Springs, CA

Microsoft Mail

Here's a tip that will help Mac users on a LocalTalk network who are using File-Maker II and Microsoft Mail.

Whenever the Mail pop-up window indicating a message appears while you are entering a date in a FileMaker II date field, a problem arises. The Mail dialog box tells you there is a message that you can "Read Now" or "Read Later." No matter which box you select, FileMaker will immediately respond with an alert box saying that you have improperly used the date field. When you click on OK, the Mail dialog box reappears. There is no apparent way out of this impasse except to restart the Mac, wasting time and possibly losing data.

But there actually is a simple way out. Instead of using the

mouse to click on a command, press Command-L, meaning "Read Later." This clears up the problem up right away — leaving just the message to enter the date correctly. The Microsoft Mail dialog box is gone. You can later read the message normally by selecting Microsoft Mail from the Apple menu.

Edwin J. Nagle
Stony Ridge, OH

Word 4.0

Someone recently described a macro for Microsoft Word that transposes two letters accidentally typed in the wrong order, a common typing error. The macro works well, but it has one drawback. Because it uses the standard Cut and Paste commands, it empties the Clipboard. Here's a macro that does the same job without using the Clipboard.

First be sure that Num Lock (toggled by the Clear key) is off — the status box in the lower left corner of the active window should not read Num. Lock. Now begin recording your macro. (The macro assumes that you've placed the insertion point just after the second mistyped letter.) Press Shift-keypad-4, which highlights the second letter. Next press Command-Option-X (the status box will now read Move To), and then press the keypad 4 twice, which moves a flashing gray vertical line to the spot just before the first

letter. Now press Return, and then move the insertion point back to its original spot by pressing the keypad 6 once. Stop recording and assign a keystroke.

Joseph O. Holmes
Brooklyn, NY

KiwiEnvelopes 3

KiwiEnvelopes 3, an envelope-addressing DA, doesn't currently support bar coding on nonlaser printers. The feature is disabled. That's too bad, because bar coding can speed your mail through the post office.

If you own SuperGlue, though, you can print the bar coding on your dot-matrix printer. Open the Chooser DA, and select Super Glue's SuperImageSaver II instead of your dot-matrix printer. Print your envelope from KiwiEnvelopes 3, and save the file in SuperGlue format. Reselect the printer from the Chooser DA. Open the Super-Glue file and print.

Michael Conley
Palm Springs, CA

OmniPage 2.0

Scanning text from magazines into files can be a real time-saver, but you'll frequently come across text in sidebars or on the contents page that is boxed and screened with a color ramp or shading, which can play havoc with OCR.

When faced with this problem, you can lessen your scan time while increasing the accuracy of the scan by selecting Lighten in the Text Settings dialog box. More often

than not, this strips out background screens and lets Omni-Page do its stuff.

K. A. McCord
Capitola, CA

HyperCard

HyperCard lets you create hidden buttons, but anyone can "peek" at their location by holding down the Command, Shift, and Option keys simultaneously. What if you want to create a hidden button that truly stays hidden?

The answer is to create *two* hidden buttons. Create the button you want, and then copy it and paste the copy directly on top of the original button. Neither button will be visible when Shift, Option, and Command are pressed, although you'll still be able to see them when the button tool is selected.

Paul Cannon
San Diego, CA

StuffIt

StuffIt lets you have up to 20 items in an archive. Usually this maximum is no problem, but if you need to send more than 20 files via direct modem transfer or an electronic-mail service, you'll have to send the data in at least two sessions — a time-consuming process for you and the recipient.

Save yourself some time and hassle by enclosing all the files in one folder (see Figure 3). StuffIt will archive the entire folder, counting it and the files it contains as only one item.

Jessica Bowmann
Truth or Consequences, NM
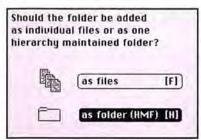
Figure 3: Any time you send someone more than a few files via modem, it makes sense to use StuffIt's ability to archive an entire folder rather than compacting each file individually.

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What's more, the PostScript language is the industry standard for higher resolution output devices. So you can proof your documents on the microLaser, then print on any typesetter with PostScript capability without recreating the document.

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One of the best things about microLaser is that you only buy what you need. Memory is upgradeable in 1MB increments up to a total of 4.5MB, and you can upgrade it yourself, without tools or technicians. All you have to do to get additional fonts is download through software or plug optional microCartridges into two credit card-size slots.

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Part of what makes microLaser a truly personal, desktop laser printer that takes up so little room is its paper drawer, which slides inside. Because microLaser holds 250 sheets standard (it holds 500 when

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TEXAS INSTRUMENTS

Help Folder

Answers to Readers' Questions

Is your Mac sick? Need a diagnosis? Leave it to the doctor — Bob LeVitus. He's the author of Dr. Macintosh: Tips, Techniques and Advice on Mastering the Macintosh *and the former editor-in-chief of* MACazine. *Now he's the guy who answers your questions in this space every month.*

✉ Write to

**Help Folder, c/o *MacUser*
950 Tower Lane, 18th Floor
Foster City, CA 94404**

Is It Slower under MultiFinder?

Q. I read in a book (not your book, *Dr. Macintosh*, of course) that processing is slowed down under Multi-Finder. I realize this would be true if you were running more than a single program, but I can't understand why processing should be slow if you're running only one program or if you merely have a window open (not active) in another program.

What are your feelings about this? My copy of *Dr. Macintosh* doesn't mention slowness as a symptom of "over-MultiFinder-use."
**Dale Mullen
via CompuServe**

A. The important thing here is perceived speed. Does running under MultiFinder *seem* slower to you? I use Multi-Finder all the time, and I've never noticed a difference in speed, except when background printing is in effect. And even if I did notice a slowdown, it would have to be pretty significant to make me give up the convenience MultiFinder provides.

I'm not sure whether, in a strictly technical sense, processing is slowed down under MultiFinder when only one task is going on (that is, when nothing is processing in the background), although I'd bet that foreground processing is indeed slowed down when something is running in the background.

Whether the book you read is technically correct or not, the bottom line for the real world is: Who cares if "processing is slowed down under MultiFinder" if you don't notice it or find it irritating?

Managing Downloadable Fonts

Q. I've been trying to use a shareware utility called Set Paths. What I want to do is put my outline (download-able) fonts into one folder rather than keeping them loose in my System Folder (which is big enough as it is). But I can't seem to get Set Paths to work properly, even after reading the documentation. Can you walk me through the process? Or can you suggest a way that I could store my outline fonts so they don't clutter my System Folder but are accessible by my LaserWriter when needed?
**Laura Janukowicz
via CompuServe**

A. I know people have used Set Paths successfully, but I don't use it, so I can't walk you through the procedure.

Here's my suggestion: Get yourself a copy of either Suitcase II or MasterJuggler — both of which can do what you ask. As long as the suitcase for the bit-mapped font (a.k.a. screen font) is in the same folder as the download-able font (a.k.a. outline font), it works. This folder can be anywhere you like — on your hard disk, on a server, or on a volume other than your startup volume.

I prefer MasterJuggler by a slight margin, although many users I know prefer Suitcase II. In a nutshell, Suitcase II has a more intuitive interface; MasterJuggler has more features — my favorite is a full-blown sound manager that lets you assign different sounds to different Mac events (startup, shutdown, insert disk, eject disk, launch application, and so on).

Video-Camera Interface?

Q. Since I've been subscribing to your magazine, I haven't seen any advertisements for a video-camera hookup to the Mac. I don't know if it's possible to hook one up, but you'd think with all the other hardware available for the Mac, someone would develop such a thing.

I own a video camera already, so it would be more economical for me to purchase an interface for it than to buy a scanner.
**Patrick Van Beuge
Torrejon Air Base, Spain**

A. Several products allow you to use a video camera to capture images for manipulation with a Macintosh. MacVision 3.0 (Koala Technologies, 70 N. 2nd St., San Jose, CA 95113; [408] 287-6278) and ComputerEyes (Digital Vision, Inc., 270 Bridge St., Dedham, MA 02026; [617] 329-5400) are two that work with most Mac models and don't cost an arm and a leg — less than $500 for MacVision and less than $250 for Computer-Eyes. Both work with 256 levels of gray on a Mac II or other color-capable Mac and can dither images for Macs that don't support color. MacVision requires at least a Mac Plus; ComputerEyes works with the 512KE as well as all newer Macs.
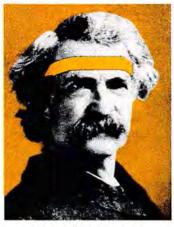
Another possibility, if you've got a Mac II-series computer, is to use one of two NuBus boards from AAPPS — MicroTV or DigiVideo (AAPPS Corp., 756 N. Pastoria Ave., Sunnyvale, CA 94086; [408] 735-8550). These relatively inexpensive boards display video from any source in a window on your monitor and allow frame capture in real time as well.

Several other manufacturers — most notably Advent Computer Products (449 Santa Fe Drive, Suite 213, Encinitas, CA 92024; [619] 942-8456) and Data Translation (100 Locke Drive, Marlboro, MA 01752; [508] 481-3700) — make more-sophisticated, more-expensive, color-capable frame-grabbing gear.

As you don't say just what your needs are, your best bet is to check out all these alternatives before you decide.

By Bob LeVitus

Word Processor

Database
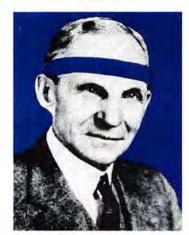
Paint

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Paint. Create or edit black & white, gray scale and color images (2, 4, 8, 16 and yes, even 24 bit). Works with TIFF, MacPaint®, and PICT files. Multiple windows.

Draw. Object-oriented graphic editing. Edit auto traced images from Paint, forms and labels from Database, and charts from Spreadsheet. Rotate text. Supports B&W and color. Open as many windows as you need.

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QuickDraw Printers and Rotated Text

Q. I've just purchased a Mac IIcx, a portrait monitor, and a Hewlett-Packard DeskWriter printer to replace a Mac II, a two-page monitor, and a LaserWriter that I formerly used.

I'm publishing a small (4 x 5 inch) booklet, using Microsoft Works 2.0a to set the type in the Times font, Aldus PageMaker 3.02 for the 8.5-x-11-inch sheet layout, and Claris MacDraw 1.9 to rotate some of the copy 180 degrees.

With my former system, the page layout reproduced perfectly on the LaserWriter, printing both the right-side-up and the upside-down type perfectly.

I can't achieve the same result with the newly bought

Double-Spacing Lines In PageMaker

Figure 1: Setting the leading to three times the type size in PageMaker produces the equivalent of double-spacing.

Q. I have PageMaker 3.0 and Microsoft Word 4.0 on my Apple Mac 512K with a 20-megabyte hard-disk drive. I can create double-spaced lines in Word easily enough — the ruler has the three "click" icons indicating the line spacing to be used.

How do I create double- or triple-spaced lines in PageMaker? The need is so basic that I can't believe you can't do this in PageMaker, but I can't figure out how.

Walter Cater
Gainesville, FL

A. One way is to create your text in Word and assign it the line-spacing attribute you desire by using the icons in the ruler. Then you can save this document and import it into PageMaker by using the Place command.

Another way is to use PageMaker's Type Specs dialog box to change the leading, which is the space between lines. Try changing the leading to three times the size of the type you're using (see Figure 1) to simulate double-spacing and to four or five times the type size for triple-spacing.

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equipment. The type I rotated with MacDraw is scrambled. Do you know what the problem is and how to rectify it?

William H. Raiford
Memphis, TN

A. The problem is the PostScript page-description language. Your old setup had it (it's built into the original LaserWriter), and your new setup doesn't. The HP DeskWriter uses a different imaging model — QuickDraw. Unfortunately, PageMaker works far better with PostScript printers than with QuickDraw ones. To make matters worse, QuickDraw doesn't handle rotated text very well. There are two things you can do.

You can get rid of the Quick-Draw printer and replace it with a PostScript or PostScript-clone printer. This probably

isn't the best solution — PostScript printers are significantly more expensive than non-PostScript alternatives. Or you could use a software PostScript emulator such as Freedom of Press (CAI, 900 Technology Park Drive, Building 8, Billerica, MA 01821; [800] 873-4367). Freedom of Press takes the output from any PostScript application (in your case, PageMaker) and lets you direct output to a non-PostScript printing device (your HP DeskWriter).

Freedom of Press is somewhat slower than a new PostScript printer, but it costs less than $495, so it's also a lot less expensive.

Slow Save in Word?

Q. I hate the Fast Save feature in Microsoft Word. My grammar checker hates

it, my spelling checker hates it, and PageMaker seems to hate it most of the time. Is there any way to turn that sucker off?

Janet A. Bubbah
Austin, TX

A. I hate it too. That's why I was overjoyed to find a solution in the manual of Correct Grammar (my favorite grammar checker). Correct Grammar can't process Word documents saved with the Fast Save feature enabled. Here's what the manual suggests to disable it permanently:

"Add the Fast Save Enabled option to the File menu. To accomplish this, choose Commands from the Edit menu. Scroll until you see Fast Save Enabled, and choose to place this item in the File menu. Then click on the Fast Save Enabled item until it does

not have a checkmark."

Many thanks to the Correct Grammar folks. I wish I'd thought of it.

[*For additional nifty Word tricks with the Commands feature, see "19 Ways to Customize Word" in this issue.* — Ed.]

Streaks on Color Monitor

Q. Ever since I purchased a color monitor for my Mac II about a year ago, I've had one annoying problem with the screen display. Whenever I run it in 256-color mode, I get static in the lower half of the screen. The static appears as annoying streaks of horizontal lines that buzz across the screen and cause any images on the screen, such as icons, to bleed to the right. The problem

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occurs only when I use 256-color mode. I thought the problem may have been with my monitor cable's being improperly shielded and have therefore tried a different cable but to no avail.

The equipment I'm using is Apple's standard 8-bit video card and Sony's CPD-1302 13-inch color monitor, the so-called replacement monitor for Apple's monitor when it was in short supply. Could the problem lie with the expanded video RAM, because the static occurs only in 256-color mode? Could both cables be defective? Or have I overlooked another possibility?

I hope you can help. I miss leaving my system in 256-color mode.

Hirotake Yamamoto
Troy, NY

A. Something is definitely wrong. Because it's unlikely that two different cables are defective, you must now methodically test the other components in your setup — the monitor and the video card — to isolate the defective one.

First test your monitor. Plug it into another Mac II with a 256-color Apple video card. If the static occurs, you can be relatively certain that it's your monitor that's defective.

If the monitor works with a different Mac II and video card, test your video card. To do this, connect a different 13-inch color monitor to your Mac II. It would be best to try another Sony CPD-1302, but an AppleColor monitor should also work. If the problem continues to occur with this monitor, you can assume that your video card is defective.

Digital Recording?

Q. I've got a large CD collection, and I frequently make compilation tapes with some of the same songs on each new tape. Is there any way I can record my favorite songs directly (digitally) onto my Mac SE, creating a master song-storage file? Ideally, I would then build individual files by categories and just call up the songs I needed one by one when assembling a tape. I'd reset the recording levels on my tape deck for each song, as I normally would when recording from my CD player.

Are there any simple, inexpensive programs (such as MacRecorder or Sound-Master) made specifically for this purpose or that I could use for it?

Switching gears, is there any way to automatically alphabetize lists I've created in a document? Can the Mac itself do it? Word 4.0?

Peter Henken
Los Angeles, CA

A. Audiomedia from Digidesign, Inc. (1360 Willow Road, Suite 101, Menlo Park, CA 94025; [415] 327-8811), is a combination Mac II Nu-Bus card and software package that lets you record CD-quality sound on a Mac II. It costs $995 and requires massive amounts of disk-storage space. How massive? Well, "Hey Jude" alone would almost fill an 80-megabyte hard disk. Unfortunately, there's no comparable card for your SE.

As for your sorting question, Word 4.0's Sort command can alphabetize a list of words in one easy step. 🔲

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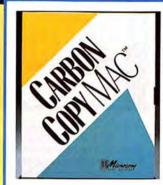
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"Last year we advertised principally in MacUser and our sales doubled," he adds. "We're satisfied with MacUser in the fact that it reaches exactly the kind of customer we want to reach - the corporate Macintosh user."

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JOHN C. DVORAK

I am the one quoted in Guy Kawasaki's column this month as saying that Microsoft's new Windows 3.0 interface for IBM PCs is a Ferrari body on a Volkswagen chassis, the Volkswagen chassis being old reliable DOS, which is the operating system over which Windows acts as a shell. But the more I consider this analogy, the more I'm apt to say that Windows is a fiberglass Ferrari look-alike on a Volkswagen chassis. It looks slick if you put a lot of effort into it — but like a kit car, it never fits together as well as the real thing. All in all, it's just a curiosity.

Guy Kawasaki imagines the Windows 3.0 pundits are divided into two camps: The ones who think it's a dud and the ones

Window Dressing

who think it will kill off Apple Computer. His own opinion — that Windows will validate the graphical user interface (GUI) and assure Apple of long-term success — is actually a third common perspective. What's missing is a fourth logical possibility: that Windows will do just the opposite and divert attention from the graphical user interface and prove by its existence that a GUI isn't needed for most power applications. Then there's a fifth camp: It says that Windows is irrelevant to the Mac community. I'm in that camp.

PC users are hardly understood by the Mac community, and I'm amused by the panicky and skittish way the latter reacts to something such as Windows 3.0, as if there were truth to the propaganda surrounding the release of the product. Of course, I always have to remember that the hapless Mac users have long since created a Soviet-bloc state of mind for themselves, having been propagandized to death by Steve "Insanely Great" Jobs from the beginning. With Steverino out of the way, a procession of three-piece-suited dullards has passed through Apple, leaving a void insofar as pure hype and BS are concerned. But as French sociologist Jacques Ellul pointed out in his book *Propaganda*, once a group is accustomed to propaganda, it becomes an addiction. The source of today's masterful propaganda, as far as these machines are concerned, is Microsoft.

While Bill Gates isn't quite the P. T. Barnum that Steve Jobs is when Jobs is at his best, Gates has the same deep-seated desire to influence the masses to get them to see things his way. His vision of the world is one in which there is a Microsoft product in every office, every bedroom, and every kitchen in every house in the world. I've known guys who, as a way of life, seek approval, but Gates is in a league by himself. Thank goodness Gates is into computers and isn't a mob boss or a preacher out to make fiendish religious zealots of us all.

Whatever the case, all this Windows hype is just propaganda. PC users will discover this long before the Mac community does, and Windows will find its rightful place on a few desktops — and in a lot of closets. This will be even more certain

whenever the next release of DOS arrives.

You must understand that the mentality of PC users is unlike that of Mac users. PC users enjoy the mechanics of the machine. PC users like results fast and prefer a bare-bones dragster to a big Lincoln, even if the Lincoln has a stereo and a sunroof.

The hottest product in the PC community right now is probably Quattro Pro from Borland. It's not a Windows spreadsheet — it's a character-based DOS application that epitomizes PC users' penchant for speed. Recently Microsoft Excel for Windows has been catching on and has been taking Windows with it to the top of the charts. These same power-mad PC users will jump ship and use Quattro Pro if they think it gives them an edge and if it outperforms Excel. Performance is all that counts.

A further irony of Windows is that the only machines on which it will perform adequately are fast (and expensive) machines such as 386- and 486-based models. These are machines owned by the aforementioned performance-crazed users. They will not put up (for long) with performance degradation. Those few PC users who couldn't care less about speed would be perfect candidates for Windows, but they all own machines that are too slow or too outdated to run it. It is to laugh.

So what's Windows got to do with Apple and the Mac? Nothing, that's what. It will have no effect whatsoever. It won't destroy the Mac. It won't validate the GUI. And the fear that it will take sales away from the Mac and require Apple to bring out a $49 el cheapo Mac is nonsense. Windows doesn't run on cheap PCs. It requires a fast 386 or 486 to be useful. Put Windows on a 286, and watch people moan. Apple got lots of free publicity from the Windows 3.0 rollout, but that's about all.

It takes more than good looks to win a market overnight. Users, and apparently some dopey Wall Street analysts, seem to think that Apple Computer is still a small-time garage operation run by kids. They figure that the company is a house of cards. But the fact is that Apple is a marketing dynamo of a company not about to be halted in its steady controlled growth.

I always like to point to the Amiga when talking about Windows. In general, the media and the pundits ignore the fact that perhaps one of the finest true multitasking GUI machines, the full-stereo Amiga, has hardly set the world on fire in the years it has been available. Furthermore, Mac users are not scrambling to it in droves. What makes anyone think that a PC running a DOS shell called Windows is going to do any better than the Amiga?

On the other hand, the Amiga, with its minimal market share, proves that competition from machines of all ilks does not mean that developers are just going to flock to the machine that's attracting the most attention or getting the most sales. Hundreds of programmers are working on Amiga software, despite its lowly market share. The best programmers code for the machines they like the best and the machines they know the best. Hack coders jump from platform to platform, hoping to make a quick buck.

Windows will be running on the machines of a lot of hack coders in the months ahead. It won't mean a thing.

BY JOHN C. DVORAK

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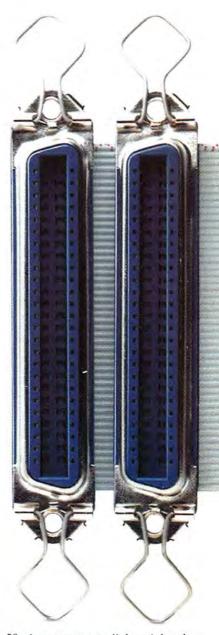
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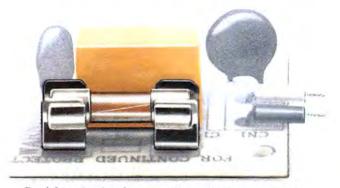
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